
# ETHICAL BEHAVIOR AND AJZEN'S THEORY OF PLANNED BEHAVIOR APPLIED TO THE DECISION TO OBTAIN PROFESSIONAL CREDENTIALS

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## Abstract

Currently, the requirement to obtain and maintain professional credentials within the engineering discipline varies among the five military departments within the U.S. Department of Defense (DoD). However, there may be an ethical requirement to do so. The purpose of this research was to investigate ethical theory and behavior theory, and their influence on the decision to obtain and maintain professional credentials. Individual Moral Philosophy (IMP) is one approach describing ethical thought. The Ethics Position Questionnaire (EPQ) measures the two dimensions of IMP: idealism and relativism. The Theory of Planned Behavior (ToPB) is used in research to predict behavior intentions and subsequently behavior from three factors: attitude toward a behavior, subjective norms, and perceived behavioral control.

A six-section survey (100 questions) was distributed to two separate groups of military engineers and thirty-seven responses were received. Confirmatory factor analysis, structural equation modeling, and multiple regression analysis were used to validate the ToPB and subsequently test the impact of the two dimensions of IMP from the EPQ on attitude. Results showed support for the predictive ability of attitude, norms, and control on intentions, and the addition of the two dimensions from the EPQ as predictors of attitude toward a behavior.

*To my husband,*

*for your endless patience and understanding*

*and to my family and friends,*

*for your support throughout this process.*

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SaraJo Paluch

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# ETHICAL BEHAVIOR AND AJZEN'S THEORY OF PLANNED BEHAVIOR APPLIED TO THE DECISION TO OBTAIN PROFESSIONAL CREDENTIALS

## I. Introduction

### Background

In May 2014, the Society of American Military Engineers (SAME) hosted the Joint Engineer Training Conference and Expo. As part of those proceedings, a panel discussion was held to discuss the development of engineers and the value of credentialing. Five industry leaders presented on the topic of credentialing and licensure, and identified the following benefits (Wright, Hasbrook, Bedford, Borochaner, & Loose, 2014):

- Better opportunities for employment after leaving military service
- Opportunity for higher salaries and more selective positions
- Show commitment to profession
- Sign of professionalism and dedication
- Improved perception of abilities
- Advance professional development
- Promote ethical standards

Of these identified benefits, the promotion of ethical standards will be the focus of this research effort.

In 2012, Sitzabee and Taylor identified several factors that currently inhibit and/or prevent U.S. Air Force Civil Engineers in obtaining and maintaining professional licensure and argued that, in reality, the engineers actually have an ethical responsibility

to do so. These inhibiting factors included that a period of apprenticeship is usually required as a licensure requirement, high rate of deployment taskings, little encouragement from Air Force leadership, no financial benefits for obtaining licensure, and promotion is not tied to licensure (Sitzabee & Taylor, 2012).

Currently, the requirement to obtain and maintain professional credentials varies among the five military departments within the U.S. Department of Defense (DoD). Like the Air Force, the Army and Marine Corps do not require certification or licensure from their military engineers. In contrast, the Navy requires a professional license before promotion from Lieutenant Commander (military grade: O-4) to Commander (O-5) (Sitzabee & Taylor, 2012).

As demonstrated above, each department maintains varied expectations for obtaining professional credentials. However, the decision to obtain and maintain credentials ultimately resides with the individual. "Ethics refers to standards of behavior that tell us how human beings ought to act in the many situations in which they find themselves" (Velasquez, Moberg, Meyer, Shanks, McLean, DeCosse, Andre, and Hanson, 2009). The decision to obtain and maintain credentials is one of those situations. To better understand the ethical decision-making process, two separate ethical approaches are considered. Koehn (1992) defined four principal ethical theories, and four secondary ethical theories, these theories will be considered in the first approach. In addition, Forsyth (2014b) identified two dimensions of moral philosophy. These dimensions will be explored in the second approach.

In addition to the ethical theories, organizational behavior theories such as the Theory of Reasoned Action (ToRA) or the Theory of Planned Behavior (ToPB) strive to explain "how the influence of attitudes combines with that of social norms and perceptions of control to shape intentions and behaviors" (Manstead, 2001). Using these recognized theories, and adding the principles addressed in ethics theory, it should be possible to identify which principles primarily drive individuals in professional career fields to decide to obtain and maintain professional credentials.

**Problem Statement and Research Questions**

As noted above, the U.S. Air Force, Army, and Marine Corps currently do not require military engineers to obtain professional credentials before practicing. Instead, the decision to obtain credentials is left to the individual. The purpose of this research was to investigate each of the ethical theories, as well as the planned behavior theory, and their influence on the decision to obtain and maintain professional credentials. The following four research questions were designed for the study:

1) How do the perceived freedom to obtain or maintain professional credentials, the subjective norms surrounding credentials, and attitude toward obtaining or maintaining credentials differ among individuals from different military departments and education levels?

2) Do views differ between individuals from services where professional credentials are required, compared to those where credentials not?

3) How do the decision-making factors (attitude toward credentials, subjective norms surrounding credentials, perceived freedom to obtain or

maintain credentials, and the intention to obtain or maintain credentials) relate to actually obtaining or maintaining professional credentials?

4) How does relativism, through an interaction term created from ethical position dimensions, impact the relationship between idealism and attitudes toward professional credentials?

**Methodology**

A literature review was conducted on ethics principles and ethics measurement tools, as well as current DoD regulation requirements for certification within each of the specified military departments. In addition, the ToPB was researched and its principles applied to the ethical decision-making process. Based on those findings, a survey was used to measure the degree of influence factors of each of the theories have on the decision to obtain and maintain professional credentials. Participants were selected from a wide range of educational (e.g., high school graduates to those with graduate degrees), professional (e.g., engineering and architecture), and organizational (e.g., government and private sector) backgrounds.

**Scope/Limitations**

Because of the many types of military engineers, and vast options for credentialing, research for this study was limited to a select few. Civil and structural engineering professionals were targeted as the primary population for this study. In addition, eight credentialing options were selected based on their popularity in the civil and structural engineering fields. Furthermore, this research focused primarily on the ToPB and ethical theory as they are applied to obtaining professional credentials.

## Key Terms

Many of the terms used in this document require definition. Terms used in the ToPB, ethics, and analysis will be defined in the text. In addition, lists of terms, abbreviations, and acronyms used in this document can be found in Appendix A.

## Summary

In this research, the ToPB will be used to better understand what, if any, factors affect military engineers' decision to obtain or maintain professional credentials. Ethical theories will be applied to the ToPB to determine if they have a significant impact on an individual's attitude toward the behavior. The next chapter will discuss relevant literature and will present studies and models which support the use of ethics and behavior theory in regard to professional credentials.

## II. Literature Review

### Purpose

The purpose of this chapter is to investigate current available literature on professional credentials, ethics, and behavior theory to inform the research being conducted in this study. Studies and models supporting these three areas will be presented along with key terms and definitions.

### Credentials

Credentialing, accreditation, certification, licensure, and registration are all terms used by professional communities to communicate that a practicing organization or professional is adequately prepared to execute their duties and responsibilities. While often used interchangeably, each of these terms has its own definition and application. To best understand the topic of certification and licensure, definition of these terms is required.

Credentialing can be seen as the overarching term which encompasses accreditation, certification, licensure and registration. Credentialing is the act of earning established qualifications or operating authority, generally issued to an individual or organization by a third party which has been granted authority to do so (Marberry, Quist & Decka, 2011). Falling under this umbrella, accreditation can be defined as "a voluntary process by which a nongovernmental entity grants a time-limited recognition or credentials to an organization after verifying that predetermined and standardized criteria are met" (Marberry, Quist & Decka, 2011). Similarly, certification is "a voluntary process by which a nongovernmental agency grants a time-limited recognition to an

individual after verifying that he or she has met predetermined and standardized criteria" (Marberry, Quist & Decka, 2011). The key difference is that accreditation is provided to organizations while certification is provided to individual people. In contrast, licensure is defined as "a process by which a governmental agency grants time-limited permission to an individual to engage in a given occupation after verifying that he or she has met predetermined and standardized criteria (including education, experience, and examination)" (Marberry, Quist & Decka, 2011). Unlike accreditation and certification, licensure is granted by government authority and generally, without licensure, practice in the specified occupation is prohibited. Licensure requirements are common in occupations where duties and responsibilities impact public safety, such as medicine, some types of engineering, and law. Registration, like licensure, is granted by governmental authority, and the term is normally used interchangeably with licensure.

In the engineering community, opportunities for certification and licensure abound. Depending on the type of engineering, and the amount of experience held, engineers can choose from multiple credentialing authorities and types of credentials to enhance their professional portfolio. Table 1 depicts eight different credential options that could be applicable to military engineers. With the exception of the Professional Engineer (PE) and Registered Architect (RA) credentials, which are licenses, all of the others listed are certifications.

The Engineer-in-Training (EIT) and Professional Engineer (PE) credentials are related. Once graduated from an accredited engineering undergraduate degree program, engineers are qualified to take the Fundamental of Engineering (FE) exam; passing the

**Table 1. Credential Information for Licensure/Certification**

| License / Certification | Exam Name | Company | Exam Cost | Exam Duration | License / Cert. Period | Maint. Fee | Min. CEUs / Cert. Period |
|---|---|---|---|---|---|---|---|
| **Engineer-in-Training (EIT)** | FE | NCEES | $225 | 6 hrs | 4 yrs | N/A | N/A |
| **Professional Engineer (PE)** | PE | NCEES | By State | 8 hrs | By State | By State | By State |
| **Project Mgmt. Professional (PMP)** | PMP | PMI | $555* | 4 hrs | 3 yrs | $150 / Cert. Period* | 60 |
| **Certified Facility Mgr. (CFM)** | CFM | IFMA | $815* | 4 hrs | 3 yrs | $265* | 120 |
| **Certified Construction Mgr. (CCM)** | CCM | CMAA | $275 | 4 hrs | 3 yrs | $200 | 25 |
| **Professional GEOINT** | NA | USGIF | NA | NA | NA | NA | NA |
| **LEED AP BD+C** | LEED AP | USGBC | $550* | 4 hrs | 2 yrs | $50 | 30 |
| **Registered Architect (RA)** | ARE | NCARB | $1470 | 4-6 hrs | By State | By State | By State |

NA – Information not available, N/A – Not applicable

* Professional Organization Membership Status: Nonmember

Information retrieved from: NCEES, 2015; PMI, 2014; IFMA, 2014; CMAA, 2015; USGIF, 2015; USGBC, 2015; NCARB, 2014

exam results in the EIT certification. Once the EIT certification is held, engineers interested in obtaining a PE license then complete up to four years of work experience before becoming eligible to take the PE exam. In some locations, the work experience is required to be completed under the supervision of an already-licensed PE. As the PE is a license, each state sets the standards for prerequisite requirements. Once all prerequisite requirements are met, and the PE exam is passed, engineers are licensed (NCEES, 2015).

As depicted in the table, licenses and certifications generally have at least three requirements that must be met before the credential is obtained. Each requires some form of a proficiency exam and/or requires some form of pre-requisite experience or knowledge. The proficiency exam plays an important role as it can be used to provide a prediction of an examinee's future professional performance, or can be evidence of competence in critical skill areas (Kane, 1982). Each credential also requires agreement to re-evaluation of the credential after a specified period of time and generally involves some form of a membership or maintenance fee. Finally, each will generally require continuing education or professional development units be completed to demonstrate continued learning and knowledge application in the field.

The company which oversees the PE license, the National Council of Examiners for Engineering and Surveying (NCEES), directly relates the importance of obtaining licensure to ethics. From their Manual of Policy and Position Statements, licensure position statement number one asserts "In the interest of protecting the public, NCEES strongly promotes the concept that all qualified individuals who practice or desire to practice engineering or surveying seek licensure, whether exempted by statute or regulation or not" (NCEES, 2014). Because ethics and, by extension, moral principles and philosophy influence the way decisions are made, an individual's concern about their impact on the public will be determined in part by their ethical viewpoint. In addition, the impact engineers' work has on the public drives the importance for professional characteristics such as education, technical competence, ethical code, and the ability to

self govern. Professional credentialing provides individuals with a means to demonstrate these characteristics.

**Certification/Licensure Requirements**

In 2012, Sitzabee and Taylor identified several factors that currently inhibit and/or prevent U.S. Air Force Civil Engineers in obtaining and maintaining professional licensure. They argued that obtaining and maintaining licensure is an ethical responsibility. The basis for this argument is that military engineers (though technically immune from the legal ramifications of practicing engineering without a license, known as sovereign immunity) should be licensed as the duties and responsibilities associated with their position require that they "plan, design, and build both facilities and infrastructure systems on military bases" which have the potential to "impact the safety, health, and welfare of the public" (Sitzabee & Taylor, 2012). This argument echoes the position statement published by the NCEES. The identified inhibiting factors included the licensure requirement of period of apprenticeship, high rate of deployment taskings, little encouragement from Air Force leadership, no financial benefits for obtaining licensure, and that promotion is not tied to licensure. In addition, Sitzabee and Taylor also identified four risks which military engineers are vulnerable to when not licensed:

> (1) mismanagement of facilities and infrastructure construction due to lack of experience, (2) below-standard work due to ignorance of standards, (3) increased likelihood that the next generation of military engineers will not be licensed, and (4) ultimately accidents, injury, or death due to substandard quality work; the paramount ethical responsibility entrusted to engineers (Sitzabee & Taylor, 2012).

Currently, the requirement to obtain and maintain professional credentials varies among the five military departments within the U.S. Department of Defense (DoD). Like

the Air Force, the Army and Marine Corps do not require certification or licensure from their military engineers. In contrast, the Navy requires credentialing before promotion from Lieutenant Commander (O-4) to Commander (O-5) (Sitzabee & Taylor, 2012). The following paragraphs discuss the credentialing requirements of each of the services in further detail.

### *Air Force*

Currently, the Air Force requires civil engineering officers to hold an undergraduate degree in an engineering discipline such as engineering management, electrical engineering, mechanical engineering, architectural engineering, or civil engineering (Sitzabee & Taylor, 2012). In addition, engineering officers are sent to a 7-week technical training school to learn military-specific tools and techniques and to fill in any education gaps from the undergraduate degree. Outside of these two requirements, no additional requirements for certification or licensure exist; however, the Career Field Education and Training Plan (CFETP) does support and promote credentialing. In addition, credential information is listed in an officer's Single Unit Retrieval Format (SURF) record. The following excerpt from the CFETP best describes the Air Force's current stance toward credentialing for Air Force officers:

> Professional registration (or licensure) is a significant step in the professional growth of civil engineer (CE) officers. Individual CE officers may choose to pursue professional registration at their own expense. Although it is not mandatory for civil engineer officers to become registered, it is a credential that enhances the CE officer's overall professional development and is highly encouraged (Dept. of the Air Force, 2010).

In addition to the officer specifications, Air Force enlisted personnel working in military engineering-related career fields are eligible to receive one credential related to their Air Force Specialty Code (AFSC) at the Air Force's expense. Modeled after the Navy and Marine Corps online credential programs, a new Air Force Credentialing Opportunities On-Line (COOL) website was established at the beginning of 2015. One of the website's features maps AFSCs with approved certifications, making selection of a possible credential easier for members.

### *Army*

The Army does not currently require that their engineering officers hold an undergraduate degree in engineering (Sitzabee & Taylor, 2012). In lieu of this requirement, engineering officers attend a 20-week long technical training school where they learn the basic technical knowledge needed for their occupational specialty. As an undergraduate degree in engineering is not required, professional registration and licensure is also not required.

In his article for Engineer Magazine, Kelcey R. Shaw describes his opinion in regard to professional certification for Army engineering officers (Shaw, 2011). He asserts that even though the PE license is out of reach for many Army engineering officers, due to lack of the undergraduate educational requirement, making other credentials (such as the Project Management Professional (PMP) certification) a requirement would benefit officers in two ways: (1) provide instant recognition of an officer's skills and technical competence and (2) demonstrate the officer's relevance in a

joint environment where other services have requirements for undergraduate degrees or credentials (Shaw, 2011).

Currently, the Army does not tie officer's Military Occupational Specialties (MOS) or skill identifiers to certifications. They do, however, include credential information on individuals' Officer Record Brief (ORB) located on the Army's Online Personnel Electronic Records Management System (iPERMS). For enlisted MOS's, credentials have been mapped to each particular MOS that would enhance the knowledge level and expertise of those soldiers. Table 2 below contains an excerpt from the Army's Technical Certification Matrix.

**Table 2. Technical Certification Matrix: Engineering**
**(U.S. Army Human Resources Command, 2014)**

| | | Engineer Credentials | |
|---|---|---|---|
| **MOS** | **MOS Description** | **Project Management Professional (PMP)** | **Certified Construction Manager (CCM)** |
| 12B | Combat Engineer | X | X |
| 12C | Bridge Crewmember | X | X |
| 12D | Diver | X | |
| 12G | Quarrying Specialist | X | |
| 12K | Plumber | X | X |
| 12M | Firefighter | X | |
| 12N | Horizontal Construction Engineer | X | X |
| 12P | Prime Power Production Specialist | X | |
| 12Q | Power Line Distribution Specialist | X | |
| 12R | Interior Electrician | X | X |
| 12T | Technical Engineering Specialist | X | |
| 12V | Concrete and Asphalt Equipment Operator | X | |
| 12W | Carpentry and Masonry Specialist | X | X |
| 12Y | Geospatial Engineer | X | |

### *Navy*

Of the five services, the Navy has the most comprehensive list of requirements for military engineers. Like the Air Force, engineering officers are required to hold an undergraduate degree in an engineering discipline. In addition, officers are required to obtain professional licensure before promotion from Lieutenant Commander (O-4) to Commander (O-5). Enlisted personnel also have credentialing opportunities, and each occupational specialty that is eligible for a credential is mapped to that credential, for funding purposes. In addition, the Navy maintains a COOL website, which allows members (officer or enlisted) to log on and obtain credential information based on their occupational specialty, rank, etc. The overview from the website lists the following objectives:

> The website is intended to serve as a resource for a variety of interested audiences and decision-makers, including:
> - Sailors and Marines who want to know what civilian credentials relate to their military occupations, what gaps might exist between their military training and civilian credentialing requirements, and what resources are available to fill gaps.
> - Military and Government leadership who want to understand how the Department of the Navy is serving its members through civilian credentialing, as directed in National Defense Authorization Act 2014.
> - Employers and Credentialing Boards interested in how military training and experience prepares Sailors and Marines for civilian credentials and jobs and how they can help these Service members attain credentials (Dept. of Navy COOL, 2014).

### *Marine Corps*

Much like the Army, the Marines do not require that their engineering officers hold an undergraduate degree in engineering (Sitzabee & Taylor, 2012). In lieu of this requirement, Marine Corps engineering officers attend the Marine Corps Engineer

School. As an undergraduate degree in engineering is not required, professional registration and licensure is also not required. The Marine Corps does promote certifications, where applicable. Like the Navy, they Marines utilize a COOL website which allows members access to credential information for their occupational specialty and rank.

**Ethics**

As demonstrated above, each department maintains varied expectations for obtaining professional credentials. However, the decision to obtain and maintain credentials largely resides with the individual. "Ethics refers to standards of behavior that tell us how human beings ought to act in the many situations in which they find themselves" (Velasquez, Moberg, Meyer, Shanks, McLean, DeCosse, Andre, and Hanson, 2009). Morals "refer to generally accepted societal norms about right and wrong human conduct" (Caswell & Gould, 2008). Generally, these two terms are used interchangeably, though they do have slightly different meanings. Linda Fan and Paul Fox provide an eloquent description of the relationship between the two terms:

> Ethical theory is a systematic exposition of particular views about what the nature and basis of good or right is. Based on ethical theory, we can assume moral principles. From the principles, we can find reasons and norms for our judgment (Fan & Fox, 2009).

Ethical and moral dilemmas most often result from the possibility of inflicting harm on others. The potential for harm to befall the public as a result of engineers' decisions, duties, and responsibilities places those professionals in a position to strive to perform in a manner that minimizes the risk of harm. For this reason, ethical and moral

principles can be applied to the decision to obtain licensure or certification. Clearly, ethics are the appropriate decision-making framework on choosing to obtain or maintain professional credentials.

One professional engineering organization, the American Society of Civil Engineers (ASCE) has developed a code of ethics that all engineers who join the organization must agree to follow. The code has seven cannons:

- Engineers shall hold paramount the safety, health and welfare of the public and shall strive to comply with the principles of sustainable development in the performance of their professional duties.
- Engineers shall perform services only in areas of their competence.
- Engineers shall issue public statements only in an objective and truthful manner.
- Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.
- Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.
- Engineers shall act in such a manner as to uphold and enhance the honor, integrity, and dignity of the engineering profession and shall act with zero tolerance for bribery, fraud, and corruption.
- Engineers shall continue their professional development throughout their careers, and shall provide opportunities for the professional development of those engineers under their supervision (ASCE, 2006).

These cannons provide guidance to engineers who work each day in the field, and while specifically written for ASCE members, arguably these cannons apply to all professional engineers. The last cannon specifically speaks to licensure and certification as almost all credentials require continued education. However, an argument can be made that many of the others also directly apply, specifically as they relate to the professional characteristics discussed earlier in this chapter.

Though many of the articles reviewed for this research argued that certification and licensure are necessary to protect the public; some other research articles identified

the existence of an opposite belief. Phillips (1982) points out that there is controversy regarding this point. Some would argue licensure is a mechanism that allows a profession to gain a monopoly over a practice. A linkage is just assumed between training, professional competence, and quality of service. Another article by Herbsleb, Sales, and Overcast identifies the legal pros and cons of various aspects of certification and licensure, including education requirements, examination requirements, and character and fitness expectations (Herbsleb, Sales & Overcast, 1985). While this opposing research does not call for the elimination of certification and licensure, it does caution against using ethics and specifically, protection of the public, as the sole reason for the existence of professional credentials.

To better understand the ethical decision-making process as applied to credentials, two separate ethical approaches are considered in this research effort. Koehn (1993) defined four principal ethical theories, and four secondary ethical theories, these theories will be considered in the first approach. In addition, Forsyth (2014b) identified two dimensions of moral philosophy. These dimensions will be explored in the second approach.

In his article "Ethical Issues Experienced by Engineering Students and Practitioners", Koehn asserts that ethical theories can be used by engineers to shape their decisions and viewpoints. They can also help engineers define their personal moral perspective and can be used in defense of moral standards. Lastly, ethical theories can be used when faced with a dilemma, allowing engineers to consider the problem from various ethical positions (Koehn, 1993). Table 3 below shows each of the ethical theories

and their definitions. Phil Lewis, in his paper titled "Civil and Construction Engineering Ethics", identified the theories Rights Ethics, Utilitarianism, Virtue Ethics, and Ethical Egoism as having the greatest impact on engineers (Lewis, undated). Similarly, Fan & Fox, 2012 identify legal requirements and self-interest (Ethical Egoism) as the two primary factors which influenced construction professionals in ethical decision-making.

**Table 3. Ethical Theories (Koehn, 1993)**

| **Theory** | **Definition** |
|---|---|
| *Principle Theories:* | |
| Rights Ethics | An act is morally right when it respects rights relevant to a situation |
| Duty Ethics | An act is right when it conforms with duties |
| Utilitarianism | Right action consists entirely in producing good consequences |
| Virtue Ethics | Persons are morally good when their character is virtuous and expressed in action, attitude and relationships |
| *Secondary Theories:* | |
| Ethical Egoism | An act is correct when it maximizes one's own interest |
| Corporate Egoism | An act is acceptable when it maximizes the intent of a corporation |
| Ethical Relativism | An act is right when it is approved by a group |
| Divine-command Ethics | An act is correct when it is approved by God |

The second approach to considering ethics involves Donelson R. Foryth's Ethical Position Questionnaire. Developed by D.R. Forsyth in 1980, the questionnaire measures individual moral philosophy, broken down into two dimensions: idealism and relativism. Individual Moral Philosophy (IMP) can be defined as "an integrated conceptual system of personal ethics. Also referred to as one's ethical ideology, a person's IMP provides guidelines for moral judgments and prescribes actions in ethical dilemmas. Idealism and

relativism are two primary constructs that comprise one's IMP" (Caswell & Gould, 2008). Idealism is

> one's innate interest in the well-being of others and the extent to which he or she believes that the fundamental rightness of an action should determine one's behavior. More simply stated, idealists believe harming others is universally wrong and attempt to avoid causing injury to others at all costs. On the contrary, non-idealists are pragmatists who recognize that moral actions do not always lead to desirable outcomes. In turn, these individuals accept that causing harm is sometimes necessary to produce good (Caswell & Gould, 2008).

While Relativism

> refers to the extent to which individuals reject universal moral rules (e.g., 'never lie or cheat', 'abide by the golden rule') when making decisions. Relativists disregard the universal application of moral rules when distinguishing between right and wrong, [and] believe decisions and actions should be based on the situation and the individuals involved. Accordingly, relativists contemplate specific circumstances and personal values more than relevant ethical principles when making a decision (Caswell & Gould, 2008).

Most individuals, when answering the questionnaire, will obtain a result that is more idealist or relativist in nature, but the two are not independent. Instead, D.R. Forsyth suggests considering results based on combination of the two. Table 4 depicts each of the four possible resulting ideologies and their definitions.

**Theory of Planned Behavior**

The Theory of Planned Behavior (ToPB) model was developed by Icek Ajzen as an extension of the earlier-proposed Theory of Reasoned Action (ToRA) model, developed by Ajzen and Fishbein. The foundation of the ToRA is that people use information available to them to make rational decisions in regard to actions (Ajzen and

**Table 4. A Taxonomy of Personal Moral Philosophies (Forsyth, 1992)**

| *Ideology* | *Dimensions* | *Approach to moral judgment* |
|---|---|---|
| Situationists | High relativism<br>High idealism | Reject moral rules; ask if the action yielded the best possible outcome in the given situation. |
| Subjectivists | High relativism<br>Low idealism | Reject moral rules; base moral judgments on personal feelings about the action and the setting. |
| Absolutists | Low relativism<br>High idealism | Feel actions are moral provided they yield positive consequences through conformity to moral rules. |
| Exceptionists | Low relativism<br>Low idealism | Feel conformity to moral rules is desirable, but exceptions to these rules are often permissible. |

Fishbein, 1980). The ToPB includes all of the same determinates of behavior as the ToRA, but also includes one additional determinate.

In developing the ToPB, Ajzen sought to provide a model for "understanding, predicting, and changing social behavior" (Ajzen, 2012). A founding part of this goal was the underlying assumption that, for the most part, people do not make decisions or take action without prior thought and consideration. Instead, Ajzen asserts that "the immediate causes of human social behavior are neither mysterious nor outside conscious awareness" (Ajzen, 2012). To this end, he proposed a model which provides a pathway for predicting intentions and behavior given three determining factors: attitude toward the behavior (attitude), subjective norms (norms), and perceived control over the behavior (control).

As the ultimate goal of the ToPB is the prediction and understanding of behavior, the first step in understanding the model is defining what constitutes a behavior. According to Ajzen, behavior can be defined as "the manifest, observable response in a given situation with respect to a given target" (Ajzen, 2006). In defining and measuring

behavior for research, the following elements comprise a complete behavior: the action, the target at which the action is directed, the context in which it occurs, and the time at which it is performed.

The immediate determinant of behavior is a person's intention to perform that behavior. Ajzen defines intention as "an indication of a person's readiness to perform a given behavior" (Ajzen, 2006). It is important to note that "a behavioral intention measure will predict the performance of any voluntary act, unless the intention measure does not correspond to the behavioral criterion in terms of action, target, context, time-frame, and/or specificity" (Sheppard, Hartwick, and Warshaw, 1988). When defining both the behavior and the behavioral intention for research, the proposed definitions should be checked for concordance to prevent such issues (Ajzen, 2006). The accuracy of the prediction made by the model can be reduced when concordance is absent. Also, intention toward a behavior is susceptible to change over time as individuals' attitudes, norms, and perceived control are altered or changed.

According to the ToPB, and as introduced above, intention is a function of three predictors: attitude, norms, and control. Attitude toward the behavior is defined as "the degree to which performance of the behavior is positively or negatively valued" (Ajzen, 2006). A person's behavioral beliefs constitute his/her attitude toward a behavior. Beliefs are composed of the attributes and supposed outcomes of the behavior. In general, a positive attitude toward a behavior should indicate a positive intention to perform the behavior. Conversely, a negative attitude toward a behavior should indicate the absence of intention to perform the behavior (Ajzen, 2012). Subjective norms are

defined as “the perceived social pressure to engage or not engage in a behavior” (Ajzen, 2006). Subject norms are determined by normative beliefs, or the “perceived behavioral expectations of important referent individuals or groups” (Ajzen, 2006). Examples of these individuals or groups include spouse, family, friends, peers, supervisors, and coworkers. Intention to perform a behavior is positively related to subjective norms. Individuals are more likely to intend a behavior if they perceive the important people around them encourage it. Perceived Behavioral control can be defined as “the extent to which people believe they can perform a given behavior if they are inclined to do so” (Ajzen, 2012). The foundation for the factor coincides with Bandura’s perceived self-efficacy concept as “self-efficacy beliefs can influence choice of activities, preparation for an activity, effort expended during performance, as well as though patters and emotional reactions” (Ajzen, 1991). Like attitudes and norms, control is positively related to intention. To conclude, people generally intend to perform a behavior when it is viewed positively, when they perceive that important others think they should perform it, and when they believe they have the necessary control to do so.

To assess the three predictive factors of intention, questions are designed to obtain individuals’ personal opinions. Generally, five to six questions are asked per factor (attitude, norms, control, and intention) using a Likert scale. A Likert scale is a response tool commonly used in survey measures that is composed of five to seven choice categories, usually ordered from least to most (for example: 1 = strongly disagree to 5 = strongly agree). Results are aggregated to a single score for each factor, which represent the individual’s thoughts/considerations in regard to the defined behavior (Ajzen, 2006).

In analyzing the factors in regard to behavior, it is important to note that depending on the behavior as it is defined, the importance of each of the predictive factors on behavioral intention may change. For example, for one behavior, norms may be more important than attitude and control, while for another behavior, attitude is more important. Assuming each factor is measured appropriately, attitude, norms, and control should always predict intention. The ability of each of the three factors to predict behavior is determined by the intention-behavior relationship, making intention a mediator. In instances where perceived behavioral control is near to or the same as actual behavioral control, the factor may be able to predict behavior (Ajzen, 2012).

The Theory of Planned Behavior, as described above, is depicted in Figure 1. Of note: demographic characteristics are not included as part of the baseline ToPB model. Instead, they are viewed as external variables which can impact attitude, norms, and control. Generally, they are added as an extension of the model (Ajzen, 2006).

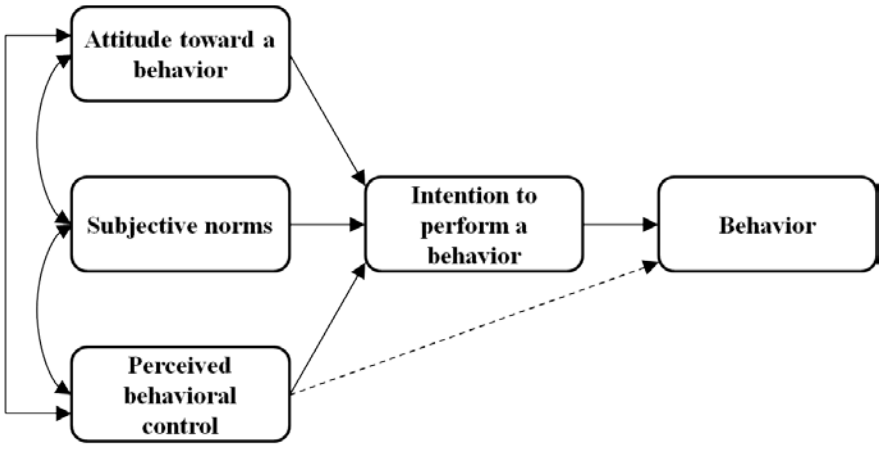


**Figure 1. Ajzen's Theory of Planned Behavior (Ajzen, 1991)**

**Framework for Thinking Ethically**

On their website titled “A Framework for Thinking Ethically”, Velazquez, et al. present a five-step process for making an ethical decision (Velasquez, Moberg, Meyer, Shanks, McLean, DeCosse, Andre, and Hanson, 2009). This process combines some of the same ethical theories from Koehn, 1993 with some of the predictive factors from the Theory of Planned Behavior:

Recognize an Ethical Issue

1. Could this decision or situation be damaging to someone or to some group? Does this decision involve a choice between a good and bad alternative, or perhaps between two "goods" or between two "bads"?
2. Is this issue about more than what is legal or what is most efficient? If so, how?

Get the Facts

3. What are the relevant facts of the case? What facts are not known? Can I learn more about the situation? Do I know enough to make a decision?
4. What individuals and groups have an important stake in the outcome? Are some concerns more important? Why?
5. What are the options for acting? Have all the relevant persons and groups been consulted? Have I identified creative options?

Evaluate Alternative Actions

6. Evaluate the options by asking the following questions:
    - Which option will produce the most good and do the least harm? (The Utilitarian Approach)
    - Which option best respects the rights of all who have a stake? (The Rights Approach)
    - Which option treats people equally or proportionately? (The Justice Approach)
    - Which option best serves the community as a whole, not just some members? (The Common Good Approach)
    - Which option leads me to act as the sort of person I want to be? (The Virtue Approach)

Make a Decision and Test It

7. Considering all these approaches, which option best addresses the situation?
8. If I told someone I respect-or told a television audience-which option I have chosen, what would they say?

Act and Reflect on the Outcome

9. How can my decision be implemented with the greatest care and attention to the concerns of all stakeholders?
10. How did my decision turn out and what have I learned from this specific situation (Velasquez, Moberg, Meyer, Shanks, McLean, DeCosse, Andre, and Hanson, 2009)?

This framework is only one of many available to help in making decisions. Ethical decision-making frameworks are helpful because they allow the decision-maker to consider their attitude toward an identified problem or issue from more than one ethical viewpoint. As shown in Step 6: Evaluate Alternative Actions, multiple ethical theories are all considered in relation to the problem or issue. In some cases, one ethical theory will be sufficient to justify an action; while in other instances, more than one theory may be required. As is explored in the research, attitudes toward a behavior or decision can shape a person's intention to perform the behavior or make the decision. Perceived control over the behavior/decision and past experience in similar situations, Steps 9 and 10, can impact intention to perform the behavior or make the decision as well.

**Summary**

This chapter presented studies and models from current available literature, along with key terms and definitions. As a means of understanding and predicting social behavior, the Theory of Planned Behavior was defined and current relevant literature was reviewed. Finally, a five step process for making ethical decisions was presented. The following chapter will discuss the methods used to test developed hypotheses and answer each of the defined research questions.

# III. Methodology

## Purpose

This chapter describes the models indentified for the research effort and outlines the statistical procedures used in testing hypotheses developed based on the following research questions: How do the perceived freedom to obtain or maintain professional credentials, the subjective norms surrounding credentials, and attitude toward obtaining or maintaining credentials differ among individuals from different military departments and education levels? Do views differ between individuals from services where professional credentials are required, compared to those where credentials not? How do the decision-making factors (attitude toward credentials, subjective norms surrounding credentials, perceived freedom to obtain or maintain credentials, and the intention to obtain or maintain credentials) relate to actually obtaining or maintaining professional credentials? How does relativism, through an interaction term created from ethical position dimensions, impact the relationship between idealism and attitudes toward professional credentials? In addition, the development of the survey instrument is discussed along with the procedures used to distribute the survey.

## Hypotheses and Models

To answer the above questions, hypotheses were developed in relation to two different models. Figure 2, Ajzen's Theory of Planned Behavior (ToPB) modified to include demographic characteristics, depicts the relationships for the first set of hypotheses: 1-a) demographic characteristics are correlated with attitude toward a

behavior, 1-b) demographic characteristics are correlated with perceived behavioral control, 1-c) demographic characteristics are correlated with subjective norms, 1-d) perceived behavioral control is positively related to intention to perform a behavior, 1-e) attitude toward a behavior is positively related to intention to perform a behavior, 1-f) subjective norms is positively related to intention to perform a behavior, 1-g) intention to perform a behavior is positively related to performance of a behavior, 1-h) perceived behavioral control is correlated with performance of a behavior, and 1-i) intention to perform a behavior may act as a mediator between perceived behavioral control and performance of a behavior.

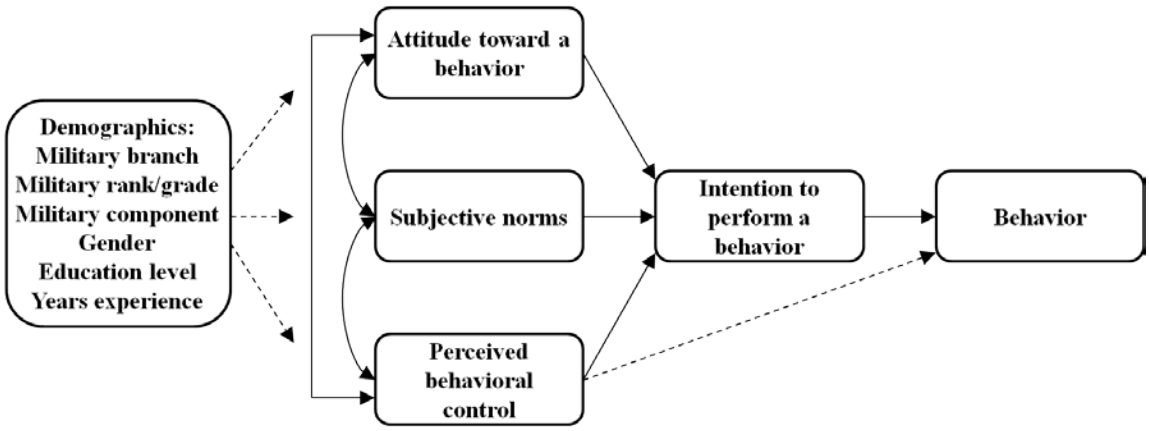


**Figure 2. Ajzen's Theory of Planned Behavior – Modified (Ajzen, 1991)**

Figure 3, which includes the two dimensions of individual moral philosophy (IMP), idealism and relativism, and their impact on attitude, depicts the relationships for the second group of hypotheses: 2-a) demographic characteristics, such as military branch, rank/grade, years experience, and education level are correlated with idealism, 2-

b) demographic characteristics are correlated with relativism, 2-c) idealism is positively related to attitude toward a behavior, 2-d) relativism is negatively related to attitude toward a behavior, and 2-e) relativism moderates the relationship between idealism and attitude through interaction.

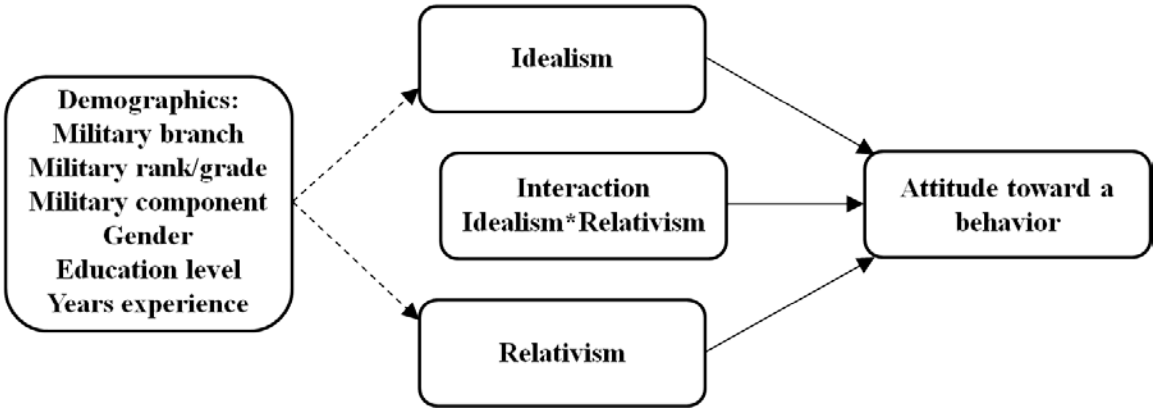


**Figure 3. Ethical Principles and their Impact on Attitude**

**Survey Development**

The survey created for this study utilized a 5-point Likert scale. A copy of the full survey instrument can be found in Appendix B. Questions were selected or developed for six sections, each directed at measuring a specific aspect: (1) Job Satisfaction, (2) Organization Commitment, (3) Ethics Theories, (4) Theory of Planned Behavior, (5) Individual Ethical Position, and (6) Demographics. Questions in each section were designed either as Likert-type or true Likert scale questions. In Likert-type scales, questions are developed and intended to be analyzed individually. Results are not

combined or aggregated, and the resulting data is categorized as ordinal. In true Likert scales, questions are developed and intended to be analyzed as a combined value. Results of each of the questions are aggregated into a single value and categorized as interval data (Boone & Boone, 2012). Section three of the survey utilized Likert-type questions, while sections one, two, four, and five all used true Likert scale questions.

### *Section One – Job Satisfaction*

Job satisfaction was selected for inclusion on the survey to provide additional context for the attitude factor from the ToPB and, by extension, the two dimensions of IMP from the Ethical Position Questionnaire (EPQ), should it be needed. Section one of the survey instrument was constructed using select questions from the Overall Job Satisfaction Scale (OJS) (Brayfield & Rothe, 1951) and the Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Dawis, England, & Lofquist, 1977). Six questions from each scale/questionnaire were selected based on their relevance to obtaining and maintaining professional credentials. A Likert scale ranging from one (strongly disagree) to five (strongly agree) was used to measure responses.

As Schleicher, Watt, & Greguras summarized in their article, "Re-examining the Job Satisfaction-Performance Relationship: The Complexity of Attitudes", attitude is not limited to only one dimension; instead, it can be separated into two components: affective and cognitive. Affective job satisfaction measures "a person's emotional feelings about the job as a whole" while cognitive job satisfaction measures "how

satisfied a person feels concerning some aspect of their job such as pay, hours or benefits" (Schleicher, et. al, 2004).

Schleicher, et al conducted a study on each of the questions within the OJS and MSQ to determine which dimension it measured. Using experts, questions were classified based on tendency towards either affective or cognitive characteristics. The results of this classification are located in the fourth column "Reported Classification" of Table 5. A replication of these procedures was conducted during the development of the survey instrument used in this study to verify that questions selected would measure each dimension of job satisfaction as expected. The results are located in the fifth column "Study Classification". These results supported use of each of the questions in the survey instrument.

***Section Two – Organization Commitment***

Organization commitment was selected for inclusion on the survey for the same reasons as job satisfaction. Section two of the survey instrument was constructed using twenty-two select questions from Meyer & Allen's Organizational Commitment Survey (Meyer & Allen, 1991). Like job satisfaction, organization commitment is composed of more than one dimension, namely affective, normative, and continuance commitment. "Affective commitment denotes an emotional attachment to, identification with, and involvement in the organization, continuance commitment denotes the perceived costs associated with leaving the organization, and normative commitment reflects a perceived

obligation to remain in the organization" (Meyer, Stanley, Herscovitch, &Topolnytsky, 2002).

**Table 5. Job Satisfaction Question Classifications**

| Question Number | Question | Job Satisfaction Classification | Source | Reported Classification | Study Classification |
|---|---|---|---|---|---|
| JS1 | I feel fairly well satisfied with my present job. | Affective | OJS | 100% | 100% |
| JS2 | I find real enjoyment in my work. | Affective | OJS | 100% | 60% |
| JS3 | Each day of work seems like it will never end. | Affective | OJS | 95% | 80% |
| JS4 | I enjoy my work more than my leisure time. | Affective | OJS | 95% | 80% |
| JS5 | I feel that I am happier in my work than most other people. | Affective | OJS | 95% | 60% |
| JS6 | Most of the time I have to force myself to go to work. | Affective | OJS | 95% | 80% |
| JS7 | I am satisfied with the chances for advancement on this job. | Cognitive | MSQ | 100% | 100% |
| JS8 | I am satisfied with my pay and the amount of work I do. | Cognitive | MSQ | 100% | 60% |
| JS9 | I am satisfied with the chance to do different things from time to time. | Cognitive | MSQ | 100% | 80% |
| JS10 | I am satisfied with the change to do something that makes use of my professional/technical abilities. | Cognitive | MSQ | 95% | 60% |
| JS11 | I am satisfied with the freedom to use my own judgment. | Cognitive | MSQ | 90% | 80% |
| JS12 | I am satisfied with the way my job provides for steady employment. | Cognitive | MSQ | 100% | 80% |

Like the process used for job satisfaction, questions were selected from the overall survey based on their relevance to obtaining and maintaining professional credentials, and then the classifications were tested using expert judgment. The results are located in the fourth column "Reported Classification" of Table 6. Classifications obtained supported the use of all questions in the survey instrument. Responses were measured on a Likert scale ranging from one (strongly disagree) to five (strongly agree).

### *Section Three – Ethics Theories*

Questions for section three were not obtained from pre-published survey instruments, but instead were created by the author for identifying which theories most impacted respondents' decision to obtain a license. The subject for each question was derived from each of the eight ethical theories identified by Koehn (1993), as presented in Chapter II. Questions three, four, and five were obtained from interview questions as created by James Bell in his unpublished AFIT final project paper on licensure and ethics (Bell, 2013). Table 7 depicts the questions that were developed from each theory. Question responses were measured on a Likert scale ranging from one (strongly disagree) to five (strongly agree).

## Table 6. Organization Commitment Question Classifications

| Question Number | Question | Organization Commitment Classification | Study Classification |
|---|---|---|---|
| OC1 | I would be very happy to spend the rest of my career with my current organization | Affective | 80% |
| OC2 | I enjoy discussing my organization with people outside of it. | Affective | 100% |
| OC3 | I really feel as if my organization's problems are my own. | Affective | 100% |
| OC4 | I think that I could easily become as attached to another organization as I am to my current one. | Affective | 80% |
| OC5 | I do not feel like "part of the family" at my organization. | Affective | 100% |
| OC6 | I do not feel emotionally attached to this organization. | Affective | 100% |
| OC7 | My organization has a great deal of personal meaning for me. | Affective | 100% |
| OC8 | I do not feel a strong sense of belonging to my organization. | Affective | 100% |
| OC9 | I do not feel any obligation to remain with my current employer. | Normative | 100% |
| OC10 | Even if it were to my advantage, I do not feel it would be right to leave my organization now. | Normative | 80% |
| OC11 | I would feel guilty if I left my organization now. | Normative | 100% |
| OC12 | My organization deserves my loyalty. | Normative | 80% |
| OC13 | I would not leave my organization right now because I have a sense obligation to the people in it. | Normative | 100% |
| OC14 | I owe a great deal to my organization. | Normative | 100% |
| OC15 | I am not afraid of what might happen if I quit my job without having another one lined up. | Continuance | 100% |
| OC16 | It would be very hard for me to leave my organization right now, even if I wanted to. | Continuance | 100% |
| OC17 | Too much in my life would be disrupted if I decided I wanted to leave my organization right now. | Continuance | 100% |
| OC18 | It wouldn't be too costly for me to leave my organization right now. | Continuance | 100% |
| OC19 | Right now staying with my organization is a matter of necessity as much as desire. | Continuance | 100% |
| OC20 | I feel that I have too few options to consider leaving my organization. | Continuance | 100% |
| OC21 | One of the few serious consequences of leaving my organization would be the scarcity of available alternatives. | Continuance | 100% |
| OC22 | One of the major reasons I continue to work for my organization is that leaving would require considerable personal sacrifice – another organization may not match the benefits that I have currently. | Continuance | 100% |

## Table 7. Ethical Theory Questions

| Question Number | Question | Theory | Definition |
|---|---|---|---|
| EQ1 | I sought and obtained professional licensure because it's more ethical for a professional to work with a license or certification than without one. | Rights Ethics | An act is morally right when it respects rights relevant to a situation |
| EQ2 | I sought and obtained professional licensure because it is my duty to do my job to the best of my ability and a license helps ensure this practice. | Duty Ethics | An act is right when it conforms with duties |
| EQ3 | I sought and obtained professional licensure because, in general, it is better for all people. (Bell, 2013) | Utilitarianism | Right action consists entirely in producing good consequences |
| EQ4 | I sought and obtained professional licensure because U.S. citizens depend on their government (and its representatives) to perform tasks to a high standard. Obtaining a professional license would help meet this standard. (Bell, 2013) | Virtue Ethics | Persons are morally good when their character is virtuous and expressed in action, attitude and relationships |
| EQ5 | I sought and obtained professional licensure because it was in my personal best interest (to improve resume, for self-satisfaction, for increased job options, etc.). (Bell, 2013) | Ethical Egoism | An act is correct when it maximizes one's own interest |
| EQ6 | I sought and obtained professional licensure because it was in the best interests of my organization. | Corporate Egoism | An act is acceptable when it maximizes the intent of a corporation |
| EQ7 | I sought and obtained professional licensure because other professionals in my field have sought and obtained a license similar to mine. | Ethical Relativism | An act is right when it is approved by a group |
| EQ8 | I sought and obtained professional licensure because it is what God would want me to do. | Divine-Command Ethics | An act is correct when it is approved by God |

***Section Four – Theory of Planned Behavior***

In a similar manner to section three, questions for section four were not obtained from pre-published survey instruments, but instead were created by the author. Icek Ajzen's "Constructing a Theory of Planned Behavior Questionnaire" and Francis, et al.'s "Constructing Questionnaires Based on the Theory of Planned Behavior" were used for guidance in the process (Ajzen, 2006; Francis, et al., 2004).

First, the behavior to be measured was defined as: an individual obtaining a professional license or certification in the future. To measure this variable, the question "Do you plan to obtain a professional license or certification in the future?" was created. Because the sample to be surveyed would include both individuals who had obtained a license or certification and individuals who had not, an additional question, "Do you currently hold a professional license or certification?" was also created.

Following the identification of the behavior, questions were developed for intention and each of the three predictive factors of intention: attitude, norms, and control. According Ajzen, generally five to six questions are developed per factor (Ajzen, 2006); however, in the interest of keeping the survey at a manageable number of questions, four questions were developed instead. Two exceptions were made to account for differences in how the factor is measured.

Tables 8 and 9 show the eight questions developed to measure the factor "attitude toward a behavior". As the rest of the survey questions measured responses on a scale of 1 (strongly disagree) to 5 (strongly agree), the first four questions developed did not follow the same pattern. Responses were still measured from 1 to 5; however, the scale

associated with the numbers used bipolar adjectives instead. In an effort to develop questions with consistency in response codes, four additional attitude questions were developed with responses ranging on the 1 (strongly disagree) to 5 (strongly agree) scale.

**Table 8. ToPB Attitude Questions**

| Question Number | Question | Response Scale | Latent Variable |
|---|---|---|---|
| PB1 | I think my obtaining (or maintaining) a professional license is (would be): | Bad → Good | Attitude toward a Behavior |
| PB2 | I think my obtaining (or maintaining) a professional license is (would be): | Worthless → Useful | Attitude toward a Behavior |
| PB3 | I think my obtaining (or maintaining) a professional license is (would be): | Detrimental → Advantageous | Attitude toward a Behavior |
| PB4 | I think my obtaining (or maintaining) a professional license is (would be): | Inconvenient → Convenient | Attitude toward a Behavior |

Following attitude, four questions each were developed for the factors "subjective norms" and "perceived behavioral control". Responses to each of these questions followed the same 1 (strongly disagree) to 5 (strongly agree) scale. Table 9 shows the questions that were developed.

Finally, eight questions, shown at the bottom of Table 9, were developed to measure intention. Responses were measured on a scale of 1 (strongly disagree) to 5 (strongly agree). The second set of four intention questions was created to measure past behavior (an indicator of intention). According to Ajzen, past behavior is not always applicable to include in a survey, depending on the nature of the behavior being studied. In some cases, having accomplished a behavior in the past can be strong indicator that a

## Table 9. ToPB Questions

| Question Number | Question | Latent Variable |
|---|---|---|
| PB5 | I think obtaining (or maintaining) a professional license will benefit my work. | Attitude toward a Behavior |
| PB6 | I think obtaining (or maintaining) a professional license will positively impact the way others see me. | Attitude toward a Behavior |
| PB7 | I think I will positively impact my career by obtaining (or maintaining) a professional license or certification. | Attitude toward a Behavior |
| PB8 | I think it is important for professionals in my line of work to obtain and maintain a professional license. | Attitude toward a Behavior |
| PB9 | Most people who are important to me approve of my obtaining and maintaining a professional license. | Subjective Norms |
| PB10 | My organization encourages me to obtain and maintain a professional license. | Subjective Norms |
| PB11 | If I choose to obtain (or maintain) a professional license, my supervisor or mentor would approve of and support my decision. | Subjective Norms |
| PB12 | Members of my peer group would criticize me for obtaining (or maintaining) a professional license. | Subjective Norms |
| PB13 | I feel capable of obtaining (or maintaining) a professional license. | Perceived Behavioral Control |
| PB14 | I believe I have control over whether or not I obtain (or maintain) a professional license. | Perceived Behavioral Control |
| PB15 | For me, obtaining (or maintaining) a professional license will cost too much time and/or money. | Perceived Behavioral Control |
| PB16 | For me, obtaining (or maintaining) a professional license will be difficult. | Perceived Behavioral Control |
| PB17 | I intend to obtain (or maintain) a professional license. | Intention to Perform a Behavior |
| PB18 | I expect to obtain (or maintain) a professional license. | Intention to Perform a Behavior |
| PB19 | I want to obtain (or maintain) a professional license. | Intention to Perform a Behavior |
| PB20 | I hope to obtain (or maintain) a professional license. | Intention to Perform a Behavior |
| PB21 | I have not obtained (or maintained) a professional license because I do not have enough time/experience in the profession. | Past Behavior |
| PB22 | In the past, I communicated or worked closely with others who had obtained a professional license. | Past Behavior |
| PB23 | Most people like me obtained a professional license before starting work at their organization. | Past Behavior |
| PB24 | I have obtained a professional license in the past, but chose not to maintain it. | Past Behavior |

behavior will be repeated, and in other cases having accomplished a behavior in the past can be a detractor from accomplishing that same behavior again in the future (Ajzen, 2006).

### *Section Five – Individual Ethical Position*

Donelson R. Forsyth developed the Ethical Position Questionnaire (EPQ) to measure variations in ethical thought. The measure was chosen for this study as it has been used in previous research in relation to both moral judgments and behavior. Section five of the survey instrument utilized all twenty questions from Forsyth's EPQ. The original scale utilized a Likert scale from one (disagreement) to nine (agreement). For this study, the response options were reduced to a one to five measure so the format would match that of the other sections. Table 10 depicts each of the EPQ questions and its classification (Forsyth, 2014a).

## Measures

To ensure the developed survey was readable and easy to understand, and to increase the likelihood of success during the main study, a pilot study was conducted from 2 June 2014 to 6 June 2014. Five individuals were asked to participate by reading and commenting on the survey instrument. Comments from the participants contributed to rewording of survey questions and correcting the survey formatting to make the instrument more user-friendly.

## Table 10. Ethical Position Question Classifications

| Question Number | Question | Ethical Position Classification |
|---|---|---|
| ES1 | People should make certain that their actions never intentionally harm another, even to a small degree. | Idealism |
| ES2 | Risks to another should never be tolerated, irrespective of how small the risk might be. | Idealism |
| ES3 | The existence of potential harm to others is always wrong, irrespective of the benefits to be gained. | Idealism |
| ES4 | One should never psychologically or physically harm another person. | Idealism |
| ES5 | One should not perform an action which might in any way threaten the dignity and welfare of another individual. | Idealism |
| ES6 | If an action could harm an innocent other, then it should not be done. | Idealism |
| ES7 | Deciding whether or not to perform an act by balancing the positive consequences of the act against the negative consequences of the act is immoral. | Idealism |
| ES8 | The dignity and welfare of the people should be the most important concern in any society. | Idealism |
| ES9 | It is never necessary to sacrifice the welfare of others. | Idealism |
| ES10 | Moral behaviors are actions that closely match ideals of the most "perfect" action. | Idealism |
| ES11 | There are no ethical principles that are so important that they should be a part of any code of ethics. | Relativism |
| ES12 | What is ethical varies from one situation and society to another. | Relativism |
| ES13 | Moral standards should be seen as being individualistic; what one person considers to be moral may be judged to be immoral by another person. | Relativism |
| ES14 | Different types of morality cannot be compared as to "rightness". | Relativism |
| ES15 | Questions of what is ethical for everyone can never be resolved since what is moral or immoral is up to the individual. | Relativism |
| ES16 | Moral standards are simply personal rules that indicate how a person should behave, and are not to be applied in making judgments of others. | Relativism |
| ES17 | Ethical considerations in interpersonal relations are so complex that individuals should be allowed to formulate their own individual codes. | Relativism |
| ES18 | Rigidly codifying an ethical position that prevents certain types of actions could stand in the way of better human relations and adjustment. | Relativism |
| ES19 | No rule concerning lying can be formulated; whether a lie is permissible or not permissible totally depends upon the situation. | Relativism |
| ES20 | Whether a lie is judged to be moral or immoral depends upon the circumstances surrounding the action. | Relativism |

By testing each of the survey questions individually for validity and reliability, and by testing the survey subscales as a whole for these same terms, threats to internal validity for the study were minimized. Even given the small sample size, a variety of respondents, coming from different ranks, service components, and government employment, helped to keep the results of the study relevant for several populations. By conducting the study in informal settings, in which respondents could answer voluntarily and at their leisure, threats to external validity concerning environmental impacts were reduced.

The statistics software PASW® Statistics 18 was used for all descriptive statistics and most of the scale analysis calculations completed for this study (IBM, 2009). Measure of reliability was achieved using Cronbach's alpha (α). Specifically, Cronbach's α is used to "measure the internal consistency of a scale", where values range between 0 and 1 (Tavakol & Dennick, 2011). For this study, α scores above 0.700 were considered acceptable and scores above 0.800 were desired. Subscale sections were created by aggregating results of all questions which measured the same, specific trait. In addition, a confirmatory factor analysis was conducted to verify that the items selected were unidimensional, i.e., have only one dimension (Tavakol & Dennick, 2011). Results of the confirmatory factor analysis are presented in Chapter IV.

**Sample and Procedures**

Survey responses were collected on 25 June 2014, from the Society of American Military Engineers (SAME) Joint Engineering Operations Course (JEOC) luncheon and on 22 July 2014, from Air Force Institute of Technology (AFIT) Graduate School of

Engineering and Management, Engineering Management program students. Participants were each given a packet which included a privacy act notice statement and the survey instrument. Figure 4 depicts the privacy act notice statement. Packets were collected immediately following each session. All procedures, as well as the survey instrument, were approved by an Institutional Review Board (IRB) for human subjects research. The IRB approval letter can be found in Appendix C.

Responses to all questions on the survey instrument ranged from one to five on a Likert scale. To determine the required number of survey respondents needed, and ensure power was adequate (power = 0.80, $\alpha = 0.05$) throughout the testing process, a large effect size was assumed and a sample size of 40 respondents were targeted (Cohen, 1992). The sample for this study included twenty-four individuals from SAME's JEOC and thirteen individuals from AFIT.

**Privacy Act Notice**

All survey documents are subject to the Privacy Act of 1974, as amended.

This study will be anonymous and will not collect any personal identifiable information. All data will be aggregated or otherwise processed before public release. Digital files will be used in the analysis of research and will be securely stored by the principal investigator after the research is complete.

**Figure 4. Privacy Act Notice Statement**

## Analysis

### *Statistical Methods Used*

Cronbach's alpha, Exploratory Factor Analysis (EFA), and Confirmatory Factor Analysis (CFA) were used to confirm inclusion of question results into the analysis. Frequency tables and correlation tables were also used to evaluate responses to survey questions. Responses to each of the eight ethical questions contained in section three of the survey were treated as ordinal data. Statistical procedures used to measure which ethical theories most/least influenced decisions to obtain or maintain professional credentials included median and mode to measure central tendency, and frequencies for variability. Correlation tables, Analysis of Variance (ANOVA), Structural Equation Modeling (SEM), and multiple regression analysis were used to answer each of the research questions.

Correlation tables "measure of the strength and direction of association that exists between two variables measured on at least an interval scale" (Lund Research Ltd., 2013d). The correlation coefficient, Pearson's r, measures the degree of linear association between two variables. A correlation of +1.00 shows a perfect positive relationship, while a correlation of -1.00 shows a perfect negative relationship.

EFA is used to reduce numerous variables into a smaller number of factors which each measure a common dimension. For this study, EFA was used for the individual analysis of each of the components of the ToPB. Maximum likelihood, direct oblimin rotations based on an eiganvalue greater than one confirmed either the use or discard of questions for each component. Missing values were addressed by pairwise deletion.

CFA was chosen for its ability to account for measurement error, and because of the model's strong theoretical framework. CFA was used to verify that all selected questions used for the ToPB conformed to the model as presented by Ajzen. A maximum likelihood, varimax rotation based on four, a-priori determined factors was conducted. Missing values were addressed by pairwise deletion. To verify normality, a test for skewness and kurtosis was conducted for each of the variables included in the model.

Structural equation modeling is a method for testing hypotheses about relationships between variables. Similar to other standard approaches, it is based on linear modeling, but a major benefit is that latent variables can be identified and tested. It also provides more conservative results as it accounts for more variance in the data.

Key definitions for SEM include model, which can be defined as "a statement about relationships between variables" (Harrington, 2009), latent variable which is a "unobserved, unmeasured, underlying construct" (Harrington, 2009) and used interchangeably with the term factor, and observed variable or indicator which is "a bit of information that is actually observed, such as a person's response to a question or a measured attribute such as weight in pounds" (Harrington, 2009). The benefits of SEM include: it "provides more flexible assumptions, uses confirmatory factor analysis to reduce measurement error by having multiple indicators per latent variable, and allows one to test entire models and to test them overall, versus focusing on individual coefficients" (Sudano & Perzynski, 2013). SEM was used for this study to conduct a path analysis for the Theory of Planned Behavior. The statistics software SPSS® Amos

18 was used for the structural equation modeling completed for this study (SPSS Inc., 2009).

To test interaction between two variables in a moderator relationship, each of the categorical inputs (Likert-scale responses) was coded, and then an interaction term between the predictor (intention and relativism) variables was created. Multiple regression analysis using PASW® statistical software was accomplished by entering all coded inputs into the first step, then the interaction into the second. Attitude toward a behavior was entered into the model as the outcome (response) variable.

### *Relationships between Statistical Methods and Research Questions*

Correlation tables and ANOVAs were used to answer how the perceived freedom to obtain or maintain, and attitude toward obtaining or maintaining, credentials differs among individuals from different military departments and education levels (research question 1). ANOVAs were also used to determine if there was a difference in attitude between groups of individuals who belong to a service where professional credentials are required, and groups where credentials are not required (research question 2). Correlation tables and SEM were used to answer how the decision-making factors (attitude toward credentials, perceived freedom to obtain or maintain credentials, and the intention to obtain or maintain credentials) related to actually obtaining or maintaining professional credentials (research question 3), and regression was used to answer how the moderator relationship in personal ethical decision-making impacts the relationship between attitudes and ethical decision-making dimensions (research question 4). Figure

5 shows the steps taken to complete the analysis, along with the relationship between the statistical methods and the research questions, as described above.

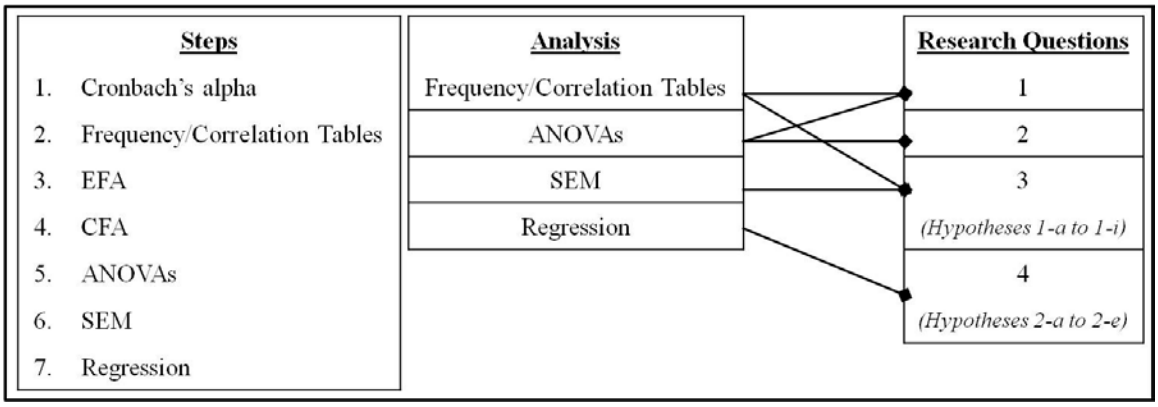


**Figure 5. Analysis Steps in Relation to Research Questions**

## Summary

The purpose of this chapter was to outline the procedures used in testing each of the study's hypotheses to ultimately answer the research questions. First, the survey instrument was described and methods for ensuring reliability, validity, and power were annotated. Second, the sample for the study and the procedures used to conduct the study were discussed. Finally, analysis methods were identified and explained. The following chapter will describe the statistical results.

# IV. Analysis and Results

## Purpose

The purpose of this chapter is to portray the findings which were obtained from the analysis methods that were described in Chapter III. The exclusion and inclusion of survey question results are discussed, and the Theory of Planned Behavior is evaluated to determine if it can be applied to this dataset. Moreover, the addition of the two dimensions of individual moral philosophy (IMP) as predictors of attitude is explored. Results for each of the hypotheses and the research questions are presented. Full outputs from each of the statistics procedures described below can be found in Appendix D, Appendix E, Appendix F, Appendix G, and Appendix H.

## Demographics Results

Of the thirty-seven individuals who responded, one (2.7%) had completed high school/GED program, nineteen (51.4%) had completed an undergraduate degree, fifteen (40.5%) had completed a masters degree, one (2.7%) had completed a doctorate degree, and one (2.7%) did not provide a response. Of those who had completed a higher education degree, nineteen (54.3%) completed their degree in an engineering field, one (2.9%) in architecture, three (8.6%) in management, one (2.9%) in business, and seven (20%) in other degree fields. Four (11.4%) respondents did not report the area of their degree.

All participants were members of the U.S. military engineering community. Twenty-eight (75.7%) participants were active duty military, one (2.7%) participant served in the guard, and four (10.8%) participants served in the reserves. Of the

remaining participants, three (8.1%) were civilians and one (2.7%) did not report their employment status. Two of the civilian participants reported having prior military experience. Thirty-three (89.2%) of the participants were male, two (5.4%) were female, and two (5.4%) did not report their gender.

Four of the five departments within the Department of Defense (DoD) were represented. Nineteen (51.4%) participants reported association with the Air Force, twelve (32.4%) with the Army, three (8.1%) with the Navy, and one (2.7%) with the Marines. Two (5.4%) participants did not report an association with a branch of service. In addition, the range of years experience in working for the DoD was two to thirty-two years. The median experience was nine years, and the mean was 10.4 years ± 6.5 years. The sum total of years experience was 355 years.

Of the thirty-six military or prior-military participants, thirty-three (91.7%) respondents were commissioned officers, one (2.8%) was a warrant officer, one (2.8%) was enlisted, and one (2.8%) was missing a response. Of the commissioned officers, sixteen (48.5%) were Company Grade and sixteen (48.5%) were Field Grade officers. One (3%) did not report a specific rank. Commissioned officer grades ranged from O-2 to O-6.

Respondents were also asked to list any professional certifications/licenses currently held which directly related to their specific career field. Of the thirty-seven participants, nine (24.3%) reported currently holding a certificate or professional license, twenty-seven (73%) currently do not, and one (2.7%) did not report. Credentials held included the Professional Engineer (PE) – 5 individuals, Leadership in Energy and

Environmental Design Accredited Professional: Building Design + Construction (LEED AP BD+C) – 2 individuals, Engineer-in-Training (EIT) – 2 individuals, Registered Architect (RA) – 1 individual, and Project Management Professional (PMP) – 1 individual. Of the nine individuals who reported currently holding a certificate or professional license, two of them reported holding two credentials.

**Procedure**

Analysis of the data collected began with evaluating the reliability coefficient, Cronbach's alpha (α), for each of the subsections of questions on the survey instrument. Correlations were also performed to verify linear relationships among variables. Next, exploratory factor analysis (EFA) was used to verify use of questions from each section of the survey. A confirmatory factor analysis (CFA) was also conducted on the questions selected for the Theory of Planned Behavior (ToPB) to verify the model as a whole. Confirmatory factor analysis was chosen for its ability to account for measurement error, and because of the model's strong theoretical framework. To determine results for each of the research questions posed for this study, Analysis of variance (ANOVA) tests were conducted, and the ToPB model was input into Structural Equation Modeling (SEM) software to test the pathways for the entire model. Finally, regression analysis was conducted to assess the two dimensions of individual moral philosophy (IMP) and their impact on attitude toward a behavior, one of the predictive factors in the ToPB.

## Survey Question Selection and Model Confirmation

### *Cronbach's Alpha (α)*

As described in Chapter III, questions from Section 1 of the survey were selected from the both the Minnesota Satisfaction Questionnaire (MSQ) and the Overall Job Satisfaction scale (OJS). Schleicher, et al., reported a reliability coefficient of 0.88 for the MSQ and 0.92 for the OJS (Schleicher, Watt, & Greguras, 2004). Results of the Cronbach's α calculations for job satisfaction questions included in the survey instrument are shown in Table 11. As a reminder, α scores above 0.700 were considered acceptable and scores above 0.800 were desired.

Organization Commitment questions for Section 2 of the survey were selected from Allen & Meyer's Organization Commitment Questionnaire (OCQ). Allen & Meyer reported coefficient values of 0.83 for affective commitment, 0.79 for normative commitment, and 0.75 for continuance commitment (Allen & Meyer, 1990). Table 11 shows reliability coefficient values from this study.

Inter-item reliability for each of the subscales of the Theory of Planned Behavior (ToPB) has been reported in several studies. Reliability coefficients ranging from 0.79 for attitude, 0.77 for norms, 0.66 for control, and 0.68 – 0.88 for intention were reported (Fitch & McCarty, 1993; Ingram, Cope, Harju, & Wuensch, 2000). Cronbach's α values calculated for this study are listed in Table 11. The Cronbach's α value of 0.695 for attitude questions one through four was low, though near to the 0.700 cut-off. This low score on its own was not enough to eliminate the questions; additional evaluation was completed using exploratory factor analysis (EFA), described in the following section. In

addition, the negative Cronbach's α value obtained for the four past behavior questions suggests that they are not well-related. Due to this reason, all four questions were excluded from further analysis.

**Table 11. Subscale Reliability for Survey Sections**

| Measure | Total Cases | Valid Cases | % | N of Items | Cronbach's α |
|---|---|---|---|---|---|
| SECTION 1 | | | | | |
| Affective Job Satisfaction (Questions 1-6) | 37 | 36 | 97.3 | 6 | .784 |
| Cognitive Job Satisfaction (Questions 7-12) | 37 | 37 | 100 | 6 | .821 |
| SECTION 2 | | | | | |
| Affective Organization Commitment (Questions 1-8) | 37 | 37 | 100 | 8 | .838 |
| Normative Organization Commitment (Questions 9-14) | 37 | 37 | 100 | 6 | .773 |
| Continuance Organization Commitment (Questions 15-22) | 37 | 36 | 97.3 | 8 | .769 |
| SECTION 4 | | | | | |
| ToPB Attitude (Questions 1-4) | 33 | 37 | 89.2 | 4 | .695 |
| ToPB Attitude (Questions 1-3) | 34 | 37 | 91.9 | 3 | .917 |
| ToPB Attitude (Questions 5-8) | 37 | 37 | 100 | 4 | .918 |
| ToPB Attitude (Questions 1-3, 5-8) | 34 | 37 | 91.9 | 7 | .900 |
| ToPB Norms (Questions 9-12) | 37 | 37 | 100 | 4 | .801 |
| ToPB Norms (Questions 10-12) | 37 | 37 | 100 | 3 | .765 |
| ToPB Control (Questions 13-16) | 37 | 36 | 97.3 | 4 | .838 |
| ToPB Intention (Questions 17-20) | 37 | 36 | 97.3 | 4 | .907 |
| ToPB Intention: Past Behavior (Questions 21-24) | 37 | 37 | 100 | 4 | -.045 |
| SECTION 5 | | | | | |
| Overall Idealism (Questions 1-10) | 37 | 35 | 94.6 | 10 | .849 |
| Overall Relativism Questions 11-20) | 37 | 37 | 100 | 10 | .847 |

In his article, “A Taxonomy of Ethical Ideologies”, Donelson R. Forsyth reported internal consistency coefficients of 0.80 and 0.73 for the idealism and relativism scales from the Ethical Position Questionnaire (EPQ), respectively (Forsyth, 1980). Table 11 depicts the reliability estimates for the subscales used in the study.

### *Exploratory Factor Analysis (EFA)*

EFA was used for the individual analysis of each of the components of the ToPB. Maximum likelihood, direct oblimin rotations based on an eiganvalue greater than one confirmed either the use or discard of questions for each component.

#### ***Attitude toward a Behavior***

Initially, all eight attitude questions were included in the factor analysis. For the non-rotated model, cumulative total variance explained equaled 76.2%. However, three factors were identified showing inconsistency between the questions and an assumed single factor parameter. The pattern matrix for the factor analysis is shown in Table 12 below.

As question four from the first set of four attitude questions did not load with either set as anticipated, the first set was discarded from further statistical analysis. The second set of four attitude questions was analyzed separately for verification. The factor matrix for the factor analysis is shown in Table 13.

## Table 12. Attitude Pattern Matrix

**Pattern Matrix[a]**

| | Factor | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| PB2 - Attitude | 1.022 | -.103 | .087 |
| PB1 - Attitude | .897 | .027 | -.012 |
| PB3 - Attitude | .715 | .273 | .103 |
| PB7 - Attitude | -.245 | .965 | .185 |
| PB6 - Attitude | .101 | .807 | -.104 |
| PB8 - Attitude | .359 | .759 | -.254 |
| PB5 - Attitude | .275 | .646 | .195 |
| PB4 - Attitude | .060 | .012 | .478 |

Extraction Method: Maximum Likelihood.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 5 iterations.

## Table 13. Attitude Factor Matrix

**Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| PB5 - Attitude | .874 |
| PB6 - Attitude | .870 |
| PB8 - Attitude | .855 |
| PB7 - Attitude | .844 |

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 3 iterations required.

In combination, the four questions explained 74.1% of cumulative total variance. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) equaled 0.851 and Bartlett's Test of Sphericity (N=37) resulted in an approximate Chi-square of 98.5 with $p < 0.001$, indicating at least one statistically significant correlation within the correlation

matrix. Communality values > 0.6 (for this study, values > 0.2 were considered acceptable) support inclusion of all four questions (Field, 2009).

***Subjective Norms***

Inclusion of all four questions was supported based on the following factors:

Cumulative Total Variance Explained: 54.2%

KMO: 0.721

Bartlett's Test: $\chi^2$ (N = 37) = 51.8, p < .001

Community Values: > 0.3

The factor matrix for the factor analysis is shown in Table 14.

**Table 14. Subjective Norms Factor Matrix**

**Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| PB11 - Norms | .947 |
| PB10 - Norms | .734 |
| PB9 - Norms | .618 |
| PB12 - Norms | .591 |

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 10 iterations required.

***Perceived Behavioral Control***

Inclusion of all four questions was supported based on the following factors:

Cumulative Total Variance Explained: 58.4%

KMO: 0.774

Bartlett's Test: $\chi^2$ (N = 36) = 57.9, p < .001

Community Values: > 0.2

The factor matrix for the factor analysis is shown in Table 15.

**Table 15. Perceived Behavior Control Factor Matrix**

**Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| PB13 - Control | .930 |
| PB15 - Control | .790 |
| PB16 - Control | .734 |
| PB14 - Control | .554 |

Extraction Method: Maximum Likelihood.

a. 1 factors extracted. 5 iterations required.

***Intention to Perform a Behavior***

Inclusion of all four questions was supported based on the following factors:

Cumulative Total Variance Explained: 71.8%

KMO: 0.609

Bartlett's Test: $\chi^2$ (N = 36) = 112.5, p < .001

Community Values: > 0.6

The factor matrix for the factor analysis is shown in Table 16.

**Table 16. Intention to Perform a Behavior Factor Matrix**

**Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| PB17 - Intention | .946 |
| PB18 - Intention | .868 |
| PB19 - Intention | .861 |
| PB20 - Intention | .693 |

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 5 iterations required.

### *Confirmatory Factor Analysis (CFA)*

CFA was used to verify that all selected questions used for the ToPB conformed to the model as presented by Ajzen. A maximum likelihood, varimax rotation based on four, a-priori determined factors was conducted. Missing values were addressed by pairwise deletion. To verify normality, a test for skewness and kurtosis was conducted for each of the variables included in the model. For this study, skewness with an absolute value of less than 3.0 and kurtosis with an absolute value of less than 10.0 were considered acceptable (Harrington, 2009). Results of the test can be found in Table 17.

Initially, all sixteen questions were included in the analysis. For the non-rotated model, cumulative total variance explained equaled 72.1%. However, question nine did not associate with Factor four with the other subjective norms questions. Instead, it loaded on Factor two with the attitude towards a behavior questions. The pattern matrix for the factor analysis is shown in Table 18. In addition, question fourteen loaded nearly equally on both Factors two, three, and four, and question fifteen loaded nearly equally on both Factors one and three.

## Table 17. Skewness and Kurtosis for ToPB Factors

| | N | Skewness | | Kurtosis | |
|---|---|---|---|---|---|
| | Statistic | Statistic | Std. Error | Statistic | Std. Error |
| PB5 - Attitude | 37 | -.703 | .388 | -.118 | .759 |
| PB6 - Attitude | 37 | -1.829 | .388 | 4.074 | .759 |
| PB7 - Attitude | 37 | -1.537 | .388 | 2.556 | .759 |
| PB8 - Attitude | 37 | -.824 | .388 | -.040 | .759 |
| PB9 - Norms | 37 | -1.896 | .388 | 3.976 | .759 |
| PB10 - Norms | 37 | -.496 | .388 | -.836 | .759 |
| PB11 - Norms | 37 | -1.945 | .388 | 4.689 | .759 |
| PB12 - Norms | 37 | -1.752 | .388 | 3.170 | .759 |
| PB13 - Control | 37 | -1.535 | .388 | 2.189 | .759 |
| PB14 - Control | 37 | -2.101 | .388 | 5.456 | .759 |
| PB15 - Control | 37 | -.605 | .388 | -.401 | .759 |
| PB16 - Control | 36 | .316 | .393 | -.923 | .768 |
| PB17 - Intention | 37 | -1.078 | .388 | -.023 | .759 |
| PB18 - Intention | 37 | -.835 | .388 | -.581 | .759 |
| PB19 - Intention | 37 | -1.063 | .388 | -.058 | .759 |
| PB20 - Intention | 36 | -.779 | .393 | -.886 | .768 |

## Table 18. Rotated Factor Matrix for ToPB

**Rotated Factor Matrix[a]**

| | Factor | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| PB20 - Intention | .870 | -.005 | -.049 | .259 |
| PB19 - Intention | .811 | .283 | .227 | .032 |
| PB18 - Intention | .734 | .286 | .346 | .121 |
| PB17 - Intention | .718 | .414 | .474 | .021 |
| PB8 - Attitude | .132 | .844 | .107 | .277 |
| PB5 - Attitude | .242 | .702 | .440 | .264 |
| PB6 - Attitude | .351 | .665 | .139 | .504 |
| PB7 - Attitude | .290 | .621 | .259 | .422 |
| PB9 - Norms | .387 | .556 | .343 | .396 |
| PB16 - Control | .119 | .145 | .846 | .150 |
| PB13 - Control | .410 | .227 | .665 | .218 |
| PB15 - Control | .516 | .190 | .549 | .273 |
| PB14 - Control | .110 | .356 | .393 | .323 |
| PB11 - Norms | .063 | .264 | .309 | .782 |
| PB12 - Norms | .165 | .234 | .011 | .613 |
| PB10 - Norms | .080 | .278 | .384 | .559 |

Extraction Method: Maximum Likelihood.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

To correct for these three issues, question nine was eliminated from the analysis. A second iteration of the CFA was run for verification. The resulting pattern matrix is shown in Table 19.

The new factor analysis explained 72.3% of cumulative total variance. The KMO test results equaled 0.806 and Bartlett's Test (N=36) resulted in an approximate Chi-square of 391.4 with $p < 0.001$, indicating at least one statistically significant correlation within the correlation matrix. Communality values > 0.4 support inclusion of all fifteen questions (Field, 2009).

**Table 19. 2nd Rotated Factor Matrix for ToPB**

**Rotated Factor Matrix[a]**

| | Factor | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| PB20 - Intention | .863 | -.020 | -.054 | .249 |
| PB19 - Intention | .814 | .270 | .224 | .042 |
| PB18 - Intention | .746 | .262 | .343 | .139 |
| PB17 - Intention | .731 | .396 | .469 | .041 |
| PB8 - Attitude | .141 | .859 | .103 | .304 |
| PB5 - Attitude | .256 | .681 | .449 | .287 |
| PB6 - Attitude | .361 | .621 | .155 | .517 |
| PB7 - Attitude | .306 | .587 | .263 | .441 |
| PB16 - Control | .126 | .121 | .865 | .155 |
| PB13 - Control | .418 | .221 | .649 | .218 |
| PB15 - Control | .526 | .170 | .536 | .273 |
| PB14 - Control | .121 | .336 | .396 | .343 |
| PB11 - Norms | .071 | .228 | .308 | .805 |
| PB12 - Norms | .173 | .222 | .003 | .634 |
| PB10 - Norms | .088 | .260 | .378 | .570 |

Extraction Method: Maximum Likelihood.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

In addition to the tests listed above, calculations were completed to assess the Normed Fit Index (NFI), Comparative Fit Index (CFI), and the Tucker Lewis Index (TLI) for the CFA results. These fit indexes are recommended as the Bartlett's Test of Sphericity Chi-square and the Goodness-of-Fit Test Chi-square can be affected by sample size (Jackson, 2009). Equations for each of these indexes are shown in Figure 6 (where Chi-square = $\chi^2$ and degrees of freedom = $df$ ) and results of the calculations are shown in Table 20. Most likely due to the small sample used in this study, the results of the NFI do not support additional analysis of the model; however, results from both the CFI and TLI are adequate.

$$NFI = \frac{(\chi^2_{Null} - \chi^2_{Implied})}{\chi^2_{Null}}$$

$$CFI = 1 - \frac{(\chi^2_{Implied} - df_{Implied})}{(\chi^2_{Null} - df_{Null})}$$

$$TLI = \frac{(\chi^2_{Null} / df_{Null}) - (\chi^2_{Implied} / df_{Implied})}{[(\chi^2_{Null} / df_{Null}) - 1]}$$

**Figure 6. Fit Index Equations**

**Table 20. Fit Index Inputs and Results for CFA**

| Null Model Chi-Square | Null Model Degrees of Freedom | Implied Model Chi-square | Implied Model Degrees of Freedom |
|---|---|---|---|
| 391.363 | 105 | 48.137 | 51 |
| | | | |
| Equation | Result | Accepted Value | Outcome |
| NFI | 0.877 | > 0.900 | Does not support the model |
| CFI | 1.010 | > 0.900 | Supports the model |
| TLI | 1.021 | > 0.900 | Supports the model |

## Results for Research Questions and Hypothesis Testing

### *Frequency Tables*

A frequency table was used to compare responses from section three of the survey instrument which sought to measure which of the ethical theories had the most and least influence on individuals' decision to pursue professional credentials. Table 21 shows a consolidated list of the frequencies for each of the questions, along with the associated median and mode. For each of the questions, N = 36. Questions five and seven had the highest positive response while question eight had the highest negative response.

**Table 21. Frequency Table - Ethical Theory Questions**

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Total | Median | Mode |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | | | |
| EQ1 | 6 | 7 | 11 | 7 | 5 | 36 | 3 | 3 |
| EQ2 | 6 | 5 | 6 | 13 | 6 | 36 | 4 | 4 |
| EQ3 | 2 | 9 | 11 | 10 | 4 | 36 | 3 | 3 |
| EQ4 | 5 | 6 | 12 | 10 | 3 | 36 | 3 | 3 |
| EQ5 | 2 | 1 | 4 | 13 | 16 | 36 | 4 | 5 |
| EQ6 | 3 | 4 | 12 | 13 | 4 | 36 | 3 | 4 |
| EQ7 | 2 | 2 | 5 | 16 | 11 | 36 | 4 | 4 |
| EQ8 | 14 | 7 | 11 | 4 | 0 | 36 | 2 | 1 |

These results indicate that, similar to the literature, Ethical Egoism seems to have the largest impact on individuals' decision to obtain or maintain professional credentials. Ethical Relativism also has an impact on this decision, though it appears to be slightly less influential. Divine Command Ethics had the least impact as was expected. SPSS output for all frequency tables used for this study can be found in Appendix D.

### *Correlation Tables*

Correlation tables were created to determine the relationships between demographic characteristics of respondents, in this case years experience, and the three ToPB prediction factors, as well as demographics and the IMP dimensions. These relationships were predicted in Hypotheses 1-a) demographic characteristics, such as years experience, are correlated with attitude toward a behavior, 1-b) demographic characteristics are correlated with perceived behavioral control, 1-c) demographic characteristics are correlated with subjective norms, 2-a) demographic characteristics are correlated with idealism, and 2-b) demographic characteristics are correlated with relativism.

The correlation coefficient, Pearson's r, measures the degree of linear association between two variables. A correlation of +1.00 shows a perfect positive relationship, while a correlation of -1.00 shows a perfect negative relationship. Tables 22 and 23 show the results of the correlation analysis.

Years experience correlates positively with all three predictive factors, and significantly so with both attitude towards a behavior and subjective norms. Hypotheses 1-a, 1-b, and 1-c were all supported for correlation direction; however, hypothesis 1-b

**Table 22. Correlation Table - Demographics and ToPB Prediction Factors**

**Correlations**

| | | ToPB - Attitude | ToPB - Norms | ToPB - Control | Yrs. Experience |
|---|---|---|---|---|---|
| ToPB - Attitude | Pearson Correlation | 1 | | | |
| | Sig. (2-tailed) | | | | |
| | N | 37 | | | |
| ToPB - Norms | Pearson Correlation | .670** | 1 | | |
| | Sig. (2-tailed) | .000 | | | |
| | N | 37 | 37 | | |
| ToPB - Control | Pearson Correlation | .619** | .563** | 1 | |
| | Sig. (2-tailed) | .000 | .000 | | |
| | N | 37 | 37 | 37 | |
| Yrs. Experience | Pearson Correlation | .405* | .439** | .154 | 1 |
| | Sig. (2-tailed) | .016 | .008 | .376 | |
| | N | 35 | 35 | 35 | 35 |

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

**Table 23. Correlation Table - Demographics and IMP Dimensions**

**Correlations**

| | | Idealism | Relativism | Yrs. Experience |
|---|---|---|---|---|
| Idealism | Pearson Correlation | 1 | | |
| | Sig. (2-tailed) | | | |
| | N | 37 | | |
| Relativism | Pearson Correlation | -.130 | 1 | |
| | Sig. (2-tailed) | .445 | | |
| | N | 37 | 37 | |
| Yrs. Experience | Pearson Correlation | .230 | -.307 | 1 |
| | Sig. (2-tailed) | .185 | .073 | |
| | N | 35 | 35 | 35 |

was not statistically significant so additional testing should be accomplished in a follow-on study with an increased sample size to verify the relationship. These results suggest that as an individual's years experience increases his/her attitude towards the behavior positively increases, his/her subjective norms positively increases, and his/her perceived control over the behavior also positively increases.

While the correlation was not significant, years experience also correlated positively with idealism supporting hypothesis 2-a, though with the same caveats as hypothesis 1-b. Hypothesis 2-a was not supported as the relationship was negative; however, the correlation was nearly significant at the 0.05 level. These results suggest that as years experience increases, individuals' idealism scores increase while relativism scores decrease.

In addition to testing these five hypotheses, correlation tables were used in preparation for, or along with some of the other statistical analyses accomplished. Those correlation tables will be presented and discussed in the following sections, where applicable.

### *Analysis of Variance (ANOVA)*

ANOVA tests were used to directly answer research questions one and two. Research question one states: How do the perceived freedom to obtain or maintain professional credentials, the subjective norms surrounding credentials, and attitude toward obtaining or maintaining credentials differ among individuals from different military departments and education levels? Research question two states: Do views

differ between individuals from services where professional credentials are required, compared to those where credentials not? Three ANOVA tests for question one were accomplished first.

The first ANOVA ran compared means for the three predictive ToPB factors and military department. Table 24 shows the results. Results do not suggest a difference between groups.

**Table 24. ANOVA Results for ToPB Factors and Military Department**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| ToPB - Attitude | Between Groups | 5.568 | 3 | 1.856 | 1.503 | .233 |
| | Within Groups | 38.279 | 31 | 1.235 | | |
| | Total | 43.846 | 34 | | | |
| ToPB - Norms | Between Groups | 2.551 | 3 | .850 | .752 | .529 |
| | Within Groups | 35.049 | 31 | 1.131 | | |
| | Total | 37.600 | 34 | | | |
| ToPB - Control | Between Groups | 5.026 | 3 | 1.675 | 1.616 | .206 |
| | Within Groups | 32.145 | 31 | 1.037 | | |
| | Total | 37.171 | 34 | | | |

The second ANOVA ran compared means for the three predictive ToPB factors and education. Table 25 shows the results. Results do not suggest a difference between groups.

**Table 25. ANOVA Results for ToPB Factors and Education Level**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| ToPB - Attitude | Between Groups | 4.817 | 3 | 1.606 | 1.313 | .287 |
| | Within Groups | 39.135 | 32 | 1.223 | | |
| | Total | 43.951 | 35 | | | |
| ToPB - Norms | Between Groups | 1.506 | 3 | .502 | .428 | .734 |
| | Within Groups | 37.491 | 32 | 1.172 | | |
| | Total | 38.997 | 35 | | | |
| ToPB - Control | Between Groups | 4.923 | 3 | 1.641 | 1.625 | .203 |
| | Within Groups | 32.320 | 32 | 1.010 | | |
| | Total | 37.243 | 35 | | | |

The third ANOVA ran compared means for the three predictive ToPB factors and degree. Table 26 shows the results. Results do not suggest a difference between groups.

**Table 26. ANOVA Results for ToPB Factors and Degree Type**

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| ToPB - Attitude | Between Groups | 3.287 | 4 | .822 | .840 | .512 |
| | Within Groups | 26.399 | 27 | .978 | | |
| | Total | 29.686 | 31 | | | |
| ToPB - Norms | Between Groups | .927 | 4 | .232 | .327 | .858 |
| | Within Groups | 19.153 | 27 | .709 | | |
| | Total | 20.080 | 31 | | | |
| ToPB - Control | Between Groups | 1.914 | 4 | .478 | .598 | .667 |
| | Within Groups | 21.615 | 27 | .801 | | |
| | Total | 23.529 | 31 | | | |

The most likely cause of the insignificance for all three of these ANOVA tests is the small sample size used for this study and, as an extension, sampling error. Sampling error occurs due to observing a portion of a target population, or sample, instead of the

actual population. In this case, the small sample size may not have provided enough information to determine a significant difference between the means for each of the groups, even if a difference actually exists.

Tests were not able to be run to assess the results for research question two as the sample size was too small. As described in Chapter II, the Department of the Navy is the only military department to require a professional license. Due to the small samples sizes for both the Marine Corps (N=1) and Navy (N=3), means between groups could not be differentiated and the use of an ANOVA was prevented. However, to further analyze if a difference in attitude, norms, and control exists between individuals from differing military departments, an individual samples t-test was accomplished. An individual samples t-test is used when testing the difference between two un-related groups (Lund Research Ltd., 2013a). As there was sufficient data for individuals from both the Army and the Air Force, these two groups were assessed. Tables 27 – 32 show the results of the independent samples t-test assessing if there were differences in attitude, norms, and control between the Army and Air Force groups.

**Table 27. Group Statistics for Attitude between Air Force and Army Groups**

**Group Statistics**

| | Department: Army or Air Force | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| ToPB – Attitude | Air Force | 19 | 3.4737 | .88935 | .20403 |
| | Army | 12 | 4.0000 | 1.46938 | .42417 |

## Table 28. T-test Results for Attitude between Air Force and Army Groups

**Independent Samples Test**

| | | | ToPB - Attitude | |
|---|---|---|---|---|
| | | | Equal variances assumed | Equal variances not assumed |
| Levene's Test for Equality of Variances | F | | 1.005 | |
| | Sig. | | .324 | |
| t-test for Equality of Means | t | | -1.247 | -1.118 |
| | df | | 29 | 16.151 |
| | Sig. (2-tailed) | | .222 | .280 |
| | Mean Difference | | -.52632 | -.52632 |
| | Std. Error Difference | | .42202 | .47069 |
| | 95% Confidence Interval of the Difference | Lower | -1.38944 | -1.52339 |
| | | Upper | .33681 | .47075 |

This study found that there was no statistically significant difference in attitude toward the behavior between the two groups.

## Table 29. Group Statistics for Norms between Air Force and Army Groups

**Group Statistics**

| Department: Army or Air Force | | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| ToPB – Norms | Air Force | 19 | 3.7719 | .66715 | .15306 |
| | Army | 12 | 3.7778 | 1.53960 | .44444 |

## Table 30. T-test Results for Norms between Air Force and Army Groups

**Independent Samples Test**

| | | | ToPB – Norms | |
|---|---|---|---|---|
| | | | Equal variances assumed | Equal variances not assumed |
| Levene's Test for Equality of Variances | F | | 6.790 | |
| | Sig. | | .014 | |
| t-test for Equality of Means | t | | -.015 | -.012 |
| | df | | 29 | 13.646 |
| | Sig. (2-tailed) | | .988 | .990 |
| | Mean Difference | | -.00585 | -.00585 |
| | Std. Error Difference | | .39976 | .47006 |
| | 95% Confidence Interval of the Difference | Lower | -.82345 | -1.01648 |
| | | Upper | .81176 | 1.00479 |

This study found that there was no statistically significant difference in subjective norms between the two groups.

## Table 31. Group Statistics for Control between Air Force and Army Groups

**Group Statistics**

| Department: Army or Air Force | | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| ToPB – Control | Air Force | 19 | 3.3816 | .73772 | .16924 |
| | Army | 12 | 3.5208 | 1.41605 | .40878 |

**Table 32. T-test Results for Control between Air Force and Army Groups**

**Independent Samples Test**

| | | | ToPB – Control | |
|---|---|---|---|---|
| | | | Equal variances assumed | Equal variances not assumed |
| Levene's Test for Equality of Variances | F | | 3.690 | |
| | Sig. | | .065 | |
| t-test for Equality of Means | t | | -.360 | -.315 |
| | df | | 29 | 14.828 |
| | Sig. (2-tailed) | | .721 | .757 |
| | Mean Difference | | -.13925 | -.13925 |
| | Std. Error Difference | | .38645 | .44243 |
| | 95% Confidence Interval of the Difference | Lower | -.92963 | -1.08322 |
| | | Upper | .65112 | .80472 |

This study found that there was no statistically significant difference in perceived control over the behavior between the two groups. Much like the ANOVA tests, the most likely cause of the insignificance for all three of these independent samples t-tests is the small sample size used for this study and, as an extension, sampling error. SPSS output for all ANOVAs used for this study can be found in Appendix E.

### *Structural Equation Modeling (SEM)*

Structural equation modeling is a method for testing hypotheses about relationships between variables. Similar to other standard approaches, it is based on linear modeling, but a major benefit is that latent variables can be identified and tested. SEM was used for this study to conduct a path analysis for the Theory of Planned Behavior. The statistics software SPSS® Amos 18 was used for the structural equation modeling completed for this study (SPSS Inc., 2009).

SEM was used to answer research question three, which states: How do the decision-making factors (attitude toward credentials, subjective norms surrounding credentials, perceived freedom to obtain or maintain credentials, and the intention to obtain or maintain credentials) relate to actually obtaining or maintaining professional credentials? Hypotheses 1-d through 1-i were developed to predict each of the relationships in the research question as follows: 1-d) perceived behavioral control is positively related to intention to perform a behavior, 1-e) attitude toward a behavior is positively related to intention to perform a behavior, 1-f) subjective norms is positively related to intention to perform a behavior, 1-g) intention to perform a behavior is positively related to performance of a behavior, 1-h) perceived behavioral control is correlated with performance of a behavior, and 1-i) intention to perform a behavior may act as a mediator between perceived behavioral control and performance of a behavior.

The path analysis conducted for the model was completed in 3 main steps. First, the model was specified by drawing variables in the AMOS software. Latent and observed variables were identified and error terms were added. Next, parameter estimation was completed by the software to determine a best fit possible for the data. Last, fit was assessed based on Chi-square and fit index results. Techniques and inputs for the analysis were obtained from steps described by Karl L. Wuensch in his paper "Conducting a Path Analysis with SPSS/AMOS" (Wuensch, 2014).

Results for the default model included a Chi-square value of 114.017 with 84 degrees of freedom and a probability level of 0.016. These results are not favorable as the significance of the Chi-square indicates that the fit between the overidentified model

and the data is not as sufficient as the fit between the just-identified model and the data. Similar to the results found for CFA, the small sample size of the study most likely impacted the results of the path analysis. As in the Confirmatory Factor Analysis discussion above, NFI, CFI, and TLI results were assessed for the model. As is suggested in the literature for SEM reporting, a fourth fit index, Root Mean Square Error of Approximation (RMSEA), was included with an accepted value of < 0.06 (Bowen & Guo, 2012). The fit index results can be found in Table 33. The CFI and RMSEA results supported the model, while TLI result was nearly sufficient for support.

**Table 33. Fit Index Results for SEM**

| Model | NFI Delta1 | TLI rho2 | CFI | RMSEA |
|---|---|---|---|---|
| Default model | .771 | .886 | .920 | .100 |
| Saturated model | 1.000 | | 1.000 | |
| Independence model | .000 | .000 | .000 | .296 |
| Accepted Value | > 0.900 | > 0.900 | > 0.900 | < 0.6 |
| Outcome | Does not support the model | Does not support the model | Supports the model | Supports the model |

Figure 7 on the next page depicts the Theory of Planned Behavior factors as drawn in step 1. Parameter estimates are shown for each of the relationships between latent variables, observed variables, and error terms. Parameters were estimated using the maximum likelihood method which "attempts to maximize the likelihood that obtained values of the criterion variable will be correctly predicted" (Wuensch, 2014). PB5 to PB8 are measured variables or indicators of attitude toward a behavior. PB10 to PB12 are indicators of subjective norms. PB13 to PB16 are indicators of perceived control over a behavior.

PB17 to PB20 are indicators of intention to perform a behavior. Attitude, subj. norms, control, and intention are latent variables. Regression coefficients are associated with the one-headed arrows in between the latent variables. Covariants are associated with the two-headed curved arrows in between the three latent predictor variables.

For the most part, research question three was successfully answered. Hypotheses 1-d and 1-e, that control and attitude are positively related to intention to perform a behavior, were both supported. Hypothesis 1-f, subjective norms is positively related to intention to perform a behavior, was not supported. While subjective norms did show a significant relationship, the negative coefficient indicates that the relationship is opposite of what was predicted. The last three hypotheses, 1-g) intention to perform a behavior is positively related to performance of a behavior, 1-h) perceived behavioral control is correlated with performance of a behavior, and 1-i) intention to perform a behavior may act as a mediator between perceived behavioral control and performance of a behavior, were not able to be tested as behavior was not included in the SEM model. The variable for behavior was eliminated as it was not measured as a continuous variable. A follow-on study, where behavior is measured as continuous instead of dichotomous, could be used to verify the rest of the model, as presented by Ajzen. In addition, logistic regression analysis, using the data collected in this study, could be conducted for the entire ToPB as it allows for a dichotomous dependent variable.

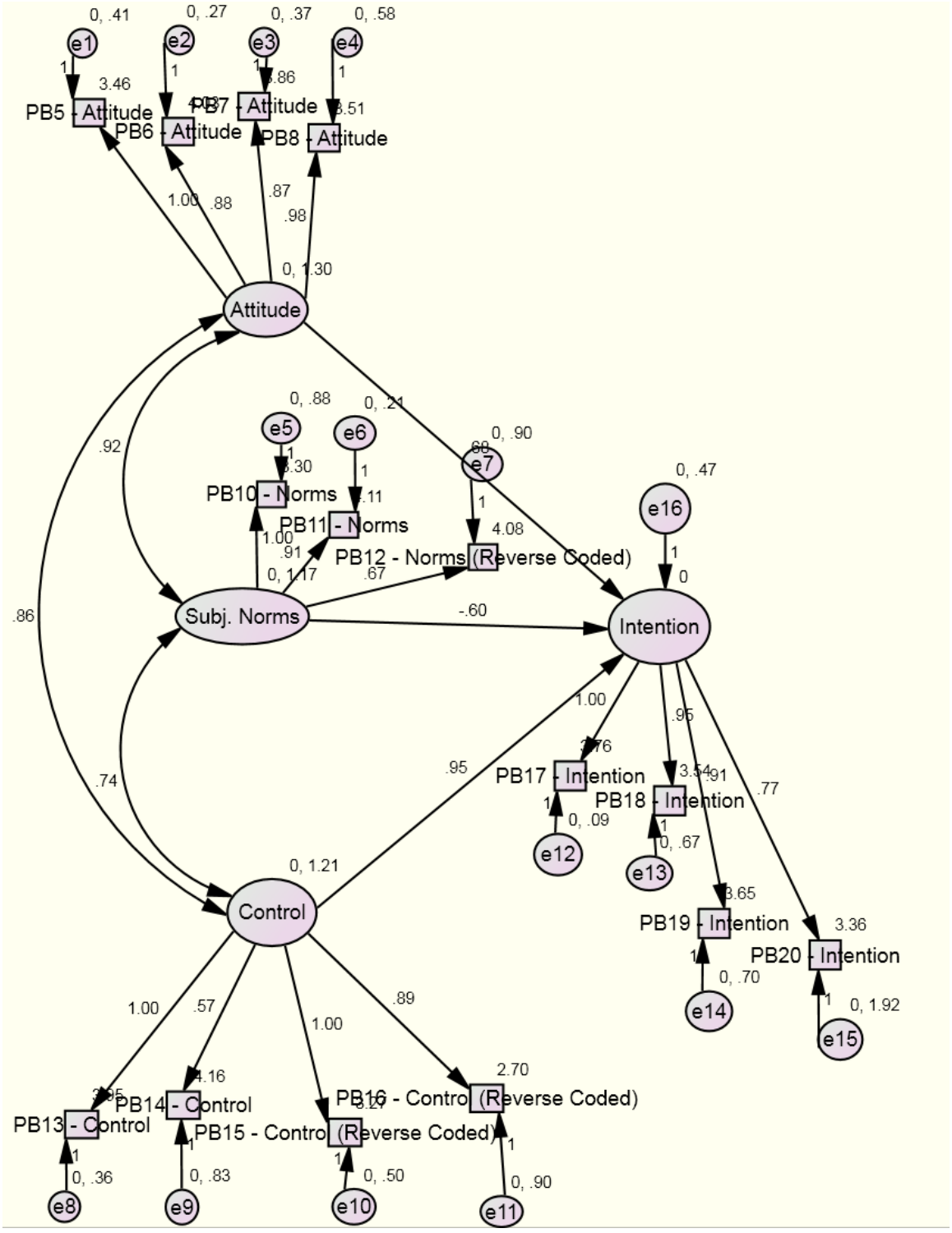


**Figure 7. Structure Equation Model for ToPB**

Even with the elimination of behavior from the SEM model preventing the use of the analysis to test hypotheses 1-g and 1-i, hypothesis 1-h was able to be tested using individual samples t-tests. Tables 34 – 35 show the results of the independent samples t-test assessing if there were differences in control between the individuals who currently hold professional credentials and those who do not.

**Table 34. Group Statistics for Control between Credential Groups**

**Group Statistics**

| Currently hold a license or certification? | | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| ToPB – Control | No | 27 | 3.3889 | .80064 | .15408 |
| | Yes | 9 | 4.3333 | .70711 | .23570 |

**Table 35. T-test Results for Control between Credential Groups**

**Independent Samples Test**

| | | | ToPB - Control | |
|---|---|---|---|---|
| | | | Equal variances assumed | Equal variances not assumed |
| Levene's Test for Equality of Variances | F | | 1.068 | |
| | Sig. | | .309 | |
| t-test for Equality of Means | t | | -3.147 | -3.354 |
| | df | | 34 | 15.431 |
| | Sig. (2-tailed) | | .003 | .004 |
| | Mean Difference | | -.94444 | -.94444 |
| | Std. Error Difference | | .30008 | .28160 |
| | 95% Confidence Interval of the Difference | Lower | -1.55429 | -1.54320 |
| | | Upper | -.33460 | -.34569 |

This study found that individuals who do not hold a professional credential had statistically significantly lower perceived behavioral control (3.39 ± 0.80) compared to individuals who currently hold a professional credential (4.33 ± 0.71), $p = 0.003$. These findings support hypothesis 1-h.

### *Multiple Regression*

Using PASW® Statistics 18, multiple regression was used to test the interaction between idealism and relativism as a moderator in the relationship between idealism and attitude toward a behavior (IBM, 2009). The results of this test directly apply to research question four, which states: How does relativism, through an interaction term created from ethical position dimensions, impact the relationship between idealism and attitudes toward professional credentials? Hypotheses 2-c through 2-e were developed to predict each of the relationships in the research question as follows: 2-c) idealism is positively related to attitude toward a behavior, 2-d) relativism is negatively related to attitude toward a behavior, and 2-e) relativism moderates the relationship between idealism and attitude through interaction. First, a correlation table was created to identify significant correlations between variables. Table 36 below shows these relationships. As hypothesized, idealism was positively related to attitude and relativism was negatively related to attitude; however, not all of the results were statistically significant.

**Table 36. Correlation Table for Multiple Regression Testing Interaction Terms**

**Correlations**

| | | ToPB Attitude (PB1 – PB4) | ToPB Attitude (PB5 – PB8) | ToPB Overall Attitude (PB1 – PB8) | Idealism | Relativism | Interaction |
|---|---|---|---|---|---|---|---|
| ToPB Attitude (PB1 – PB4) | Pearson Correlation | 1 | | | | | |
| | Sig. (2-tailed) | | | | | | |
| | N | 35 | | | | | |
| ToPB Attitude (PB5 – PB8) | Pearson Correlation | .519** | 1 | | | | |
| | Sig. (2-tailed) | .001 | | | | | |
| | N | 35 | 37 | | | | |
| ToPB Overall Attitude (PB1 – PB8) | Pearson Correlation | .797** | .931** | 1 | | | |
| | Sig. (2-tailed) | .000 | .000 | | | | |
| | N | 35 | 37 | 37 | | | |
| Idealism | Pearson Correlation | .587** | .112 | .235 | 1 | | |
| | Sig. (2-tailed) | .000 | .508 | .161 | | | |
| | N | 35 | 37 | 37 | 37 | | |
| Relativism | Pearson Correlation | -.190 | -.225 | -.230 | -.130 | 1 | |
| | Sig. (2-tailed) | .275 | .181 | .170 | .445 | | |
| | N | 35 | 37 | 37 | 37 | 37 | |
| Interaction | Pearson Correlation | .309 | -.070 | .021 | .572** | .717** | 1 |
| | Sig. (2-tailed) | .071 | .681 | .903 | .000 | .000 | |
| | N | 35 | 37 | 37 | 37 | 37 | 37 |

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Following the correlation table analysis, variables were input in the regression analysis. Outputs are shown in Tables 37 – 39.

## Table 37. Model Summary Regression Output

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .301[a] | .091 | .008 | 1.12152 |

a. Predictors: (Constant), Interaction, Idealism, Relativism

## Table 38. ANOVA Regression Output

**ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 4.138 | 3 | 1.379 | 1.097 | .364[a] |
| | Residual | 41.507 | 33 | 1.258 | | |
| | Total | 45.645 | 36 | | | |

a. Predictors: (Constant), Interaction, Idealism, Relativism
b. Dependent Variable: ToPB – Attitude (2nd 4 Questions)

## Table 39. Coefficient Regression Output

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 7.648 | 3.415 | | 2.240 | .032 |
| | Idealism | -.090 | .098 | -.556 | -.914 | .367 |
| | Relativism | -.143 | .105 | -.976 | -1.365 | .182 |
| | Interaction | .003 | .003 | .947 | 1.096 | .281 |

a. Dependent Variable: ToPB – Attitude (2nd 4 Questions)

Results of this analysis do not support the hypothesized interaction; however, a second set of attitude questions, which were thrown out of the CFA and SEM analysis, was also considered. Outputs from the second regression analysis are shown in Tables 40 – 42.

**Table 40. Model Summary Regression Output**

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .687[a] | .472 | .421 | .53477 |

a. Predictors: (Constant), Interaction, Idealism, Relativism

**Table 41. ANOVA Regression Output**

**ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7.928 | 3 | 2.643 | 9.240 | .000[a] |
| | Residual | 8.865 | 31 | .286 | | |
| | Total | 16.793 | 34 | | | |

a. Predictors: (Constant), Interaction, Idealism, Relativism
b. Dependent Variable: ToPB – Attitude (1st 4 Questions)

**Table 42. Coefficient Regression Output**

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 6.570 | 1.675 | | 3.921 | .000 |
| | Idealism | -.062 | .048 | -.614 | -1.286 | .208 |
| | Relativism | -.140 | .052 | -1.528 | -2.719 | .011 |
| | Interaction | .004 | .001 | 1.756 | 2.585 | .015 |

a. Dependent Variable: ToPB – Attitude (1st 4 Questions)

Results of the second analysis support the existence of an interaction term, but caution must be applied to these results as the attitude factors have not been tested in the ToPB model as a whole. In addition, the Cronbach's alpha value for these four questions (0.695), while close to the accepted value of 0.700, was low enough to warrant a closer inspection of the data to determine inclusion in the model.

**Investigative Questions Answered**

Each of the hypotheses listed at the beginning of Chapter III were tested and the results described in the paragraphs above. A summary of the results of the first set of hypothesis testing are shown in Table 43 below:

**Table 43. Results of Group 1 Hypothesis Testing**

| Number | Path | Hypothesized | Beta | SE | P | Supported |
|---|---|---|---|---|---|---|
| 1-a | Demographics – Attitude | Correlation | | | | Yes |
| 1-b | Demographics – Control | Correlation | | | | Yes |
| 1-c | Demographics – Norms | Correlation | | | | Yes |
| 1-d | Control – Intention | + | .945 | .246 | .000 | Yes |
| 1-e | Attitude – Intention | + | .683 | .272 | .012 | Yes |
| 1-f | Norms – Intention | + | -.598 | .283 | .035 | No |
| 1-g | Intention – Behavior | + | N/A | N/A | N/A | N/A |
| 1-h | Control – Behavior | Correlation | | | | Yes |
| 1-i | Control – Intention – Behavior | Mediation | N/A | N/A | N/A | N/A |

Results for the second set of hypothesis testing are shown in Table 44:

**Table 44. Results of Group 2 Hypothesis Testing**

| Number | Path | Hypothesized | Beta | SE | P | Supported |
|---|---|---|---|---|---|---|
| 2-a | Demographics – Idealism | Correlation | | | | Yes |
| 2-b | Demographics – Relativism | Correlation | | | | No |
| 2-c | Idealism – Attitude | + | .058 | .014 | .000 | Yes |
| 2-d | Relativism – Attitude | - | -.011 | .013 | .424 | Yes |
| 2-e | Interaction – Attitude | Moderation | .004 | .001 | .015 | Yes* |

Hypothesis testing was conducted in an effort to ultimately answer the four research questions developed for this study. To review, the four research questions for this research effort included:

1) How do the perceived freedom to obtain or maintain professional credentials, the subjective norms surrounding credentials, and attitude toward obtaining or maintaining credentials differ among individuals from different military departments and education levels?

2) Do views differ between individuals from services where professional credentials are required, compared to those where credentials not?

3) How do the decision-making factors (attitude toward credentials, subjective norms surrounding credentials, perceived freedom to obtain or maintain credentials, and the intention to obtain or maintain credentials) relate to actually obtaining or maintaining professional credentials?

4) How does relativism, through an interaction term created from ethical position dimensions, impact the relationship between idealism and attitudes toward professional credentials?

Unfortunately, results for research questions one and two were inconclusive. The ANOVAs and independent samples t-tests determined that no significance between the mean of groups was found for education, military branch and degree. One of the possible reasons for the inconclusive results may be the small sample size, along with little variation in military branch and degrees held. A larger sample size with greater variation in individuals from different military departments would provide a more accurate evaluation of the population.

In response to question three, overall, the Theory of Planned Behavior as described by Ajzen was supported. The Confirmatory Factor Analysis determined four distinct factors and the Structure Equation Model supported overall fit of the model to the data. However, conclusive results could not be found to support the full path from the three predictive factors to intention and concluding with behavior. The absence of these results is due to the dichotomous characteristics of the behavior variable. A follow-on study which measures behavior on a continuous scale could be tested with these same methods to verify the ToPB as a whole. In addition to these findings, years experience correlates positively with all three predictive factors, and statistically significantly with both attitude towards a behavior and subjective norms.

In response to question four, the interaction term was found to contribute to the regression model as a moderator. Caution must be applied to these results as the attitude factor used has not been tested in the ToPB model as a whole. In addition, the Cronbach's alpha value for these four questions (0.695), while close to the accepted value

of 0.700, was low enough to warrant a closer inspection of the data to determine inclusion in the model.

## Limitations of the Study

The sample used for this research was obtained as a sample of convenience. Surveys were distributed to two different groups, both with affiliation to AFIT. A greater variation in individuals surveyed would provide a better representation of the military engineering population.

Missing data was handled by pairwise deletion, the default setting in SPSS®. While this method does include all viable cases for correlations and covariances, it can reduce power (Harrington, 2009).

As already addressed in the results, given the small sample size, care should be taken in interpreting scores and values obtained from the analysis. A larger sample size could improve the significance of results and also provide a better representation of the population. In addition, low power is considered in small sample sizes as most statistical techniques depend on large sample size to produce accurate results.

## Summary

This chapter described the analysis procedures used to evaluate results of the survey and describe quantitative findings which resulted from the analysis. The analysis procedure, step-by-step statistical procedures, and results of the analysis in regard to the four research questions were explained. The following chapter will describe the conclusions drawn from this analysis and its associated results. Recommendations for action and future research will also be discussed.

# V. Conclusions and Recommendations

## Purpose

The purpose of this chapter is to summarize the impact the analysis and results of the research had on the problem statement and to discuss how the research expanded the current body of knowledge for both the Theory of Planned Behavior (ToPB) and the influence of individual moral philosophy (IMP) on attitude. Conclusions of the research are summarized, and recommendations for action and future research are proposed.

## Conclusions of Research

The entire ToPB model, from predictive factors to performance of a behavior, was not able to be tested due to the dependent variable (performance of a behavior) being dichotomous instead of continuous. The model's latent variables (the three predictive factors of the ToPB and their impact on intention to perform a behavior), however, were supported by this research effort. In addition, the proposed predictors of attitude (the two dimensions of IMP) were supported; but, caution must be applied to the results as the attitude dimension was not tested in the ToPB model as a whole.

Other findings included that, similar to the literature, Ethical Egoism seems to have the largest impact on individuals' decision to obtain or maintain professional credentials. Ethical Egoism theory states that an act is correct when it maximizes one's own interest. For engineers, the benefits of obtaining certification or licensure often do directly impact the individual in ways such as increased professional confidence, increased pay, etc. Ethical Relativism also has an impact on this decision, though it appears to be slightly less influential. The Ethical Relativism Theory states that an act is

right when approved by a group. As certification and licensure can serve as an indicator of an individual's technical competence in a subject area, it can impact how competitive an individual is within the career field for jobs and/or promotion. If other individuals in the group have a certificate or license, and view it as important, than the individual contemplating obtaining a license may find their view influential in the decision. Divine Command Ethics, that an act is right when approved by God, had the least impact as was expected. Furthermore, the results of this study suggest that as an individual's years experience increases his/her attitude towards the behavior positively increases, his/her subjective norms positively increases, and his/her perceived control over the behavior also positively increases. Additionally, as years experience increases, individuals' idealism scores increase while relativism scores decrease. Finally, this study found that individuals who do not hold a professional credential had statistically significantly lower perceived behavioral control compared to individuals who currently hold a professional credential, as was expected.

**Significance of Research**

The results obtained from this study provide information to military and civilian leadership and decision-makers on:

- which ethical principles primarily drive the decision to obtain professional credentials. In this case, Ethical Egoism and Ethical Relativism had the most impact.
- which elements of the decision-making process can influence intention to perform a behavior (in this case obtaining professional credentials). Attitude, subjective

norms, and perceived behavioral control all had an impact on intention to obtain or maintain licensure.

This research study provides an opportunity for those in the position of setting policy to use the above information to develop or make adjustments to programs that will influence the behavior of military engineers with respect to certification and licensure.

**Recommendations for Action**

The results of this study suggest that the action of obtaining or maintaining professional credentials can be understood from the Theory of Planned Behavior. In addition, it also suggests that the majority of military engineers is interested in, or support the idea of obtaining professional credentials. More than half of participants indicated they either already have a professional certification or license or desire to obtain one. By increasing and/or improving individuals' attitude toward obtaining credentials, subjective norms in regard to obtaining credentials, and perceived behavior control of obtaining credentials, the results of this research suggest that intention toward obtaining licensure should also increase.

Ethically speaking, the majority of the engineers who responded to the survey were most influenced by ethical egoism (benefits them on an individual level) and ethical relativism (acts are approved by a group). Leadership from the five military departments and from supporting organizations such as the Society for American Military Engineers (SAME) will probably gain the most benefit from marketing credentialing from those two angles.

**Recommendations for Future Research**

A follow-on study measuring the dependent variable of behavior as continuous instead of dichotomous, could be used to verify the whole ToPB model, as presented by Ajzen. This analysis would require writing four questions, to be answered on a Likert scale, about the act of obtaining or maintaining professional credentials. In addition, if given more time, the research would also benefit from two rounds of surveys to measure if intentions and performance of a behavior change over time. Another option, using the data collected in this study, could employ logistic regression analysis to test the entire model as that method allows for a dichotomous dependent variable.

As a modification was made to the Theory of Planned Behavior model, a second study is suggested to replicate the findings from this research effort. A study using a larger sample, with greater variance in individuals from military departments, would provide better insight into the differences in intention toward professional credentials, based on whether the service department requires credentials or not. A larger sample size would also improve the credibility of the results.

Additional follow-on topics for this research include: (1) Comparison of credential requirements between military engineering and other career fields/occupational specialties (e.g. Cyberspace Operations, Medical, Legal, etc.), and (2) Delphi study of leadership (military & corporate) opinions on professional credentials.

## Appendix A. Terms, Abbreviations, and Acronyms

### Glossary of Terms

Accreditation – "a voluntary process by which a nongovernmental entity grants a time-limited recognition or credentials to an organization after verifying that predetermined and standardized criteria are met" (Marberry, Quist & Decka, 2011)

Attitude toward a behavior – "the degree to which performance of the behavior is positively or negatively valued" (Ajzen, 2006)

Behavior – "the manifest, observable response in a given situation with respect to a given target" (Ajzen, 2006)

Certification – "a voluntary process by which a nongovernmental agency grants a time-limited recognition to an individual after verifying that he or she has met predetermined and standardized criteria" (Marberry, Quist & Decka, 2011)

Corporate Egoism – "An act is acceptable when it maximizes the intent of a corporation" (Koehn, 1993)

Credential – "an attestation of qualification, competence, or authority issued to an individual by a third party with a relevant or de facto authority or assumed competence to do so" (Marberry, Quist & Decka, 2011)

Divine Command Ethics – "An act is correct when it is approved by God" (Koehn, 1993)

Duty Ethics – "An act is right when it conforms with duties" (Koehn, 1993)

Ethical Egoism – "An act is correct when it maximizes one's own interst" (Koehn, 1993)

Ethical Relativism – "An act is right when it is approved by a group" (Koehn, 1993)

Ethics – "standards of behavior that tell us how human beings ought to act in the many situations in which they find themselves" (Velasquez, Moberg, Meyer, Shanks, McLean, DeCosse, Andre, and Hanson, 2009)

Factor – used interchangeably with latent variable

Idealism – "one's innate interest in the well-being of others and the extent to which he or she believes that the fundamental rightness of an action should determine one's behavior" (Caswell & Gould, 2008)

Individual Moral Philosophy – "an integrated conceptual system of personal ethics; also referred to as one's ethical ideology, it provides guidelines for moral judgments and prescribes actions in ethical dilemmas" (Caswell & Gould, 2008)

Intention to perform a behavior – "an indication of a person's readiness to perform a given behavior" (Ajzen, 2006)

Latent variable – "unobserved, unmeasured, underlying construct" (Harrington, 2009)

Licensure – "a process by which a governmental agency grants time-limited permission to an individual to engage in a given occupation after verifying that he or she has met predetermined and standardized criteria (including education, experience, and examination)" (Marberry, Quist & Decka, 2011)

Likert scale - a response tool commonly used in survey measures that is composed of five to seven choice categories, usually ordered from least to most (for example: 1 = strongly disagree to 5 = strongly agree)

Model – "a statement about relationships between variables" (Harrington, 2009)

Morals – “refer to generally accepted societal norms about right and wrong human conduct” (Caswell & Gould, 2008)

Observed variable – “a bit of information that is actually observed, such as a person’s response to a question or a measured attribute such as weight in pounds” (Harrington, 2009)

Perceived behavioral control – ‘the extent to which people believe they can perform a given behavior if they are inclined to do so” (Ajzen, 2012)

Registration – used interchangeably with licensure

Relativism – “refers to the extent to which individuals reject universal moral rules (e.g., ‘never lie or cheat’, ‘abide by the golden rule’) when making decisions” (Caswell & Gould, 2008)

Rights Ethics – “An act is morally right when it respects rights relevant to a situation” (Koehn, 1993)

Subjective norms – ‘the perceived social pressure to engage or not engage in a behavior” (Ajzen, 2006)

Utilitarianism – “Right action consists entirely in producing good consequences” (Koehn, 1993)

Virtue Ethics – “Persons are morally good when their character is virtuous and expressed in action, attitude and relationships” (Koehn, 1993)

**List of Abbreviations**

Cert. – Certification

Hrs – Hours

Maint. – Maintenance

Mgmt. – Management

Mgr. – Manager

Min. – Minimum

U.S. – United States

Yrs – Years

**List of Acronyms**

AFIT – Air Force Institute of Technology

AFROTC – Air Force Reserve Officer Training Corps

AFSC – Air Force Specialty Code

ANOVA – Analysis of Variance

AP – Accredited Professional

ARE – Architect Registration Examination

ASCE – American Society of Civil Engineers

BD+C – Building Design + Construction

CCM – Certified Construction Manager

CE – Civil Engineer

CEU – Continuing Education Units

CFA – Confirmatory Factor Analysis

CFETP – Career Field Education and Training Plan

CFI – Comparative Fit Index

CFM – Certified Facility Manager

CMAA – Construction Management Association of America

COOL – Credentialing Opportunities On-Line

DoD – Department of Defense

EFA – Exploratory Factor Analysis

EIT – Engineer-in-Training

EPQ – Ethical Position Questionnaire

FE – Fundamentals of Engineering

GED – General Education Development

GEOINT – Geospatial Intelligence

IFMA – International Facility Management Association

IMP – Individual Moral Philosophy

iPERMS – Online Personnel Electronic Records Management System

IRB – Institutional Review Board

JEOC – Joint Engineering Operations Course

JS – Job Satisfaction

JSTARS – Joint Surveillance Target Attack Radar System

KMO – Kaiser-Meyer-Olkin Measure of Sampling Adequacy

LEED – Leadership in Energy and Environmental Design

MOS – Military Occupational Specialty

MSQ – Minnesota Satisfaction Questionnaire

N/A – Not Applicable

NA – Not Available

NCARB – National Council of Architectural Registration Boards

NCEES – National Council of Examiners for Engineering and Surveying

NFI – Normed Fit Index

NSPE – National Society of Professional Engineers

OC – Organization Commitment

OCQ – Organization Commitment Questionnaire

OIC – Officer in Charge

OJS – Overall Job Satisfaction Scale

ORB – Officer Record Brief

PDU – Professional Development Units

PE (exam) – Principles and Practice of Engineering

PE (license) – Professional Engineer

PMI – Project Management Institute

PMP – Project Management Professional

RA – Registered Architect

SAME – Society of American Military Engineers

SEM – Structural Equation Modeling

SURF – Single Unit Retrieval Format

TLI – Tucker Lewis Index

ToPB – Theory of Planned Behavior

ToRA – Theory of Reasoned Action

USGBC – U.S. Green Building Council

USGIF – U.S. Geospatial Intelligence Foundation

## Appendix B. Survey Instrument

**Privacy Act Notice**

All survey documents are subject to the Privacy Act of 1974, as amended.

This study will be anonymous and will not collect any personal identifiable information. All data will be aggregated or otherwise processed before public release. Digital files will be used in the analysis of research and will be securely stored by the principal investigator after the research is complete.

## The Influence of Ethics and Organizational Behavior on the Decision to Obtain Professional Licensure

Instructions: Please take some time to tell us what you think about the principles which primarily drove (or will drive) you to decide to obtain a professional license. For all questions, please answer with your personal opinion in regard to licensing for your primary occupation in a home station or non-combatant situation. There are no right or wrong responses and your answers are completely confidential, so be as frank as you wish. This is not a test. The survey should take 10 to 15 minutes to complete; the answers will be combined into groups for reporting purposes.

Professional Licensure or Certification: a practice which involves work experience and accredited training and examinations; intended to protect the public through the application of professional, educational and/or ethical standards of practice.

| *Ask yourself: How much do I agree with the following statements?* | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| I feel fairly well satisfied with my present job. | 1 | 2 | 3 | 4 | 5 |
| I find real enjoyment in my work. | 1 | 2 | 3 | 4 | 5 |
| Each day of work seems like it will never end. | 1 | 2 | 3 | 4 | 5 |
| I enjoy my work more than my leisure time. | 1 | 2 | 3 | 4 | 5 |
| I feel that I am happier in my work than most other people. | 1 | 2 | 3 | 4 | 5 |
| Most of the time I have to force myself to go to work. | 1 | 2 | 3 | 4 | 5 |
| I am satisfied with the chances for advancement on this job. | 1 | 2 | 3 | 4 | 5 |
| I am satisfied with my pay and the amount of work I do. | 1 | 2 | 3 | 4 | 5 |
| I am satisfied with the chance to do different things from time to time. | 1 | 2 | 3 | 4 | 5 |
| I am satisfied with the chance to do something that makes use of my professional/technical abilities. | 1 | 2 | 3 | 4 | 5 |
| I am satisfied with the freedom to use my own judgment. | 1 | 2 | 3 | 4 | 5 |
| I am satisfied with the way my job provides for steady employment. | 1 | 2 | 3 | 4 | 5 |

| *Ask yourself: How much do I agree with the following statements?* **If military, please consider your current organization to be the Air Force, Army, etc. In addition, consider your current position to include only those duties which do not involve deployed or combatant activities.* | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| I would be very happy to spend the rest of my career with my current organization. | 1 | 2 | 3 | 4 | 5 |
| I enjoy discussing my organization with people outside of it. | 1 | 2 | 3 | 4 | 5 |
| I really feel as if my organization's problems are my own. | 1 | 2 | 3 | 4 | 5 |
| I think that I could easily become as attached to another organization as I am to my current one. | 1 | 2 | 3 | 4 | 5 |
| I do not feel like "part of the family" at my organization. | 1 | 2 | 3 | 4 | 5 |
| I do not feel emotionally attached to this organization. | 1 | 2 | 3 | 4 | 5 |
| My organization has a great deal of personal meaning for me. | 1 | 2 | 3 | 4 | 5 |
| I do not feel a strong sense of belonging to my organization. | 1 | 2 | 3 | 4 | 5 |
| I do not feel any obligation to remain with my current employer. | 1 | 2 | 3 | 4 | 5 |
| Even if it were to my advantage, I do not feel it would be right to leave my organization now. | 1 | 2 | 3 | 4 | 5 |
| I would feel guilty if I left my organization now. | 1 | 2 | 3 | 4 | 5 |
| My organization deserves my loyalty. | 1 | 2 | 3 | 4 | 5 |
| I would not leave my organization right now because I have a sense of obligation to the people in it. | 1 | 2 | 3 | 4 | 5 |
| I owe a great deal to my organization. | 1 | 2 | 3 | 4 | 5 |
| I am not afraid of what might happen if I quit my job without having another on lined up. | 1 | 2 | 3 | 4 | 5 |
| It would be very hard for me to leave my organization right now, even if I wanted to. | 1 | 2 | 3 | 4 | 5 |
| Too much in my life would be disrupted if I decided I wanted to leave my organization right now. | 1 | 2 | 3 | 4 | 5 |
| It wouldn't be too costly for me to leave my organization right now. | 1 | 2 | 3 | 4 | 5 |
| Right now staying with my organization is a matter of necessity as much as desire. | 1 | 2 | 3 | 4 | 5 |
| I feel that I have too few options to consider leaving my organization. | 1 | 2 | 3 | 4 | 5 |
| One of the few serious consequences of leaving my organization would be the scarcity of available alternatives. | 1 | 2 | 3 | 4 | 5 |
| One of the major reasons I continue to work for my organization is that leaving would require considerable personal sacrifice - another organization may not match the benefits that I have currently. | 1 | 2 | 3 | 4 | 5 |

| *Ask yourself: How much do I agree with the following statements?* **If you do not currently have a license, please consider how these statements might affect your decision to obtain a license in the future.* | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| I sought and obtained professional licensure because it's more ethical for a professional to work with a license or certification than without one. | 1 | 2 | 3 | 4 | 5 |
| I sought and obtained professional licensure because it is my duty to do my job to the best of my ability and a license helps ensure this practice. | 1 | 2 | 3 | 4 | 5 |
| I sought and obtained professional licensure because, in general, it is better for all people. | 1 | 2 | 3 | 4 | 5 |

| *Ask yourself: How much do I agree with the following statements?* ***If you do not currently have a license, please consider how these statements might affect your decision to obtain a license in the future.* | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| I sought and obtained professional licensure because U.S. citizens depend on their government (and its representatives) to perform tasks to a high standard. Obtaining a professional license would help meet this standard. | 1 | 2 | 3 | 4 | 5 |
| I sought and obtained professional licensure because it was in my personal best interest (to improve resume, for self-satisfaction, for increased job options, etc.). | 1 | 2 | 3 | 4 | 5 |
| I sought and obtained professional licensure because it was in the best interests of my organization. | 1 | 2 | 3 | 4 | 5 |
| I sought and obtained professional licensure because other professionals in my field have sought and obtained a license similar to mine. | 1 | 2 | 3 | 4 | 5 |
| I sought and obtained professional licensure because it is what God would want me to do. | 1 | 2 | 3 | 4 | 5 |

| *Ask yourself: What is my attitude toward the following statements?* | Bad | | Neutral | | Good |
|---|---|---|---|---|---|
| I think my obtaining (or maintaining) a professional license is (would be): | 1 | 2 | 3 | 4 | 5 |
| | **Worthless** | | **Neutral** | | **Useful** |
| I think my obtaining (or maintaining) a professional license is (would be): | 1 | 2 | 3 | 4 | 5 |
| | **Detrimental** | | **Neutral** | | **Advantageous** |
| I think my obtaining (or maintaining) a professional license is (would be): | 1 | 2 | 3 | 4 | 5 |
| | **Inconvenient** | | **Neutral** | | **Convenient** |
| I think my obtaining (or maintaining) a professional license is (would be): | 1 | 2 | 3 | 4 | 5 |

| *Ask yourself: How much do I agree with the following statements?* | Not Applicable | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| I think obtaining (or maintaining) a professional license will benefit my work. | 0 | 1 | 2 | 3 | 4 | 5 |
| I think obtaining (or maintaining) a professional license will positively impact the way others see me. | 0 | 1 | 2 | 3 | 4 | 5 |
| I think I will positively impact my career by obtaining (or maintaining) a professional license or certification. | 0 | 1 | 2 | 3 | 4 | 5 |
| I think it is important for professionals in my line of work to obtain and maintain a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| Most people who are important to me approve of my obtaining and maintaining a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| My organization encourages me to obtain and maintain a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| If I choose to obtain (or maintain) a professional license, my supervisor or mentor would approve of and support my decision. | 0 | 1 | 2 | 3 | 4 | 5 |
| Members of my peer group would criticize me for obtaining (or maintaining) a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| I feel capable of obtaining (or maintaining) a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| I believe I have control over whether or not I obtain (or maintain) a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| For me, obtaining (or maintaining) a professional license will cost too much time and/or money. | 0 | 1 | 2 | 3 | 4 | 5 |
| For me, obtaining (or maintaining) a professional license will be difficult. | 0 | 1 | 2 | 3 | 4 | 5 |
| I intend to obtain (or maintain) a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| I expect to obtain (or maintain) a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| I want to obtain (or maintain) a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| I hope to obtain (or maintain) a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| I have not obtained (or maintained) a professional license because I do not have enough time/experience in the profession. | 0 | 1 | 2 | 3 | 4 | 5 |
| In the past, I communicated or worked closely with others who had obtained a professional license. | 0 | 1 | 2 | 3 | 4 | 5 |
| Most people like me obtained a professional license before starting work at their organization. | 0 | 1 | 2 | 3 | 4 | 5 |
| I have obtained a professional license in the past, but chose not to maintain it. | 0 | 1 | 2 | 3 | 4 | 5 |

| *Ask yourself: How much do I agree with the following statements?* ***If military, please consider your responses in regard to a home station situation to include only those activities which do not involve deployed or combatant actions. For these questions, "other people" include family, friends, neighbors, co-workers, the American public, etc.* | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| People should make certain that their actions never intentionally harm another, even to a small degree. | 1 | 2 | 3 | 4 | 5 |

| *Ask yourself: How much do I agree with the following statements?* **If military, please consider your responses in regard to a home station situation to include only those activities which do not involve deployed or combatant actions. For these questions, "other people" include family, friends, neighbors, co-workers, the American public, etc.* | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| Risks to another should never be tolerated, irrespective of how small the risk might be. | 1 | 2 | 3 | 4 | 5 |
| The existence of potential harm to others is always wrong, irrespective of the benefits to be gained. | 1 | 2 | 3 | 4 | 5 |
| One should never psychologically or physically harm another person. | 1 | 2 | 3 | 4 | 5 |
| One should not perform an action which might in any way threaten the dignity and welfare of another individual. | 1 | 2 | 3 | 4 | 5 |
| If an action could harm an innocent other, then it should not be done. | 1 | 2 | 3 | 4 | 5 |
| Deciding whether or not to perform an act by balancing the positive consequences of the act against the negative consequences of the act is immoral. | 1 | 2 | 3 | 4 | 5 |
| The dignity and welfare of the people should be the most important concern in any society. | 1 | 2 | 3 | 4 | 5 |
| It is never necessary to sacrifice the welfare of others. | 1 | 2 | 3 | 4 | 5 |
| Moral behaviors are actions that closely match ideals of the most "perfect" action. | 1 | 2 | 3 | 4 | 5 |
| There are no ethical principles that are so important that they should be a part of any code of ethics. | 1 | 2 | 3 | 4 | 5 |
| What is ethical varies from one situation and society to another. | 1 | 2 | 3 | 4 | 5 |
| Moral standards should be seen as being individualistic; what one person considers to be moral may be judged to be immoral by another person. | 1 | 2 | 3 | 4 | 5 |
| Different types of morality cannot be compared as to "rightness". | 1 | 2 | 3 | 4 | 5 |
| Questions of what is ethical for everyone can never be resolved since what is moral or immoral is up to the individual. | 1 | 2 | 3 | 4 | 5 |
| Moral standards are simply personal rules that indicate how a person should behave, and are not to be applied in making judgments of others. | 1 | 2 | 3 | 4 | 5 |
| Ethical considerations in interpersonal relations are so complex that individuals should be allowed to formulate their own individual codes. | 1 | 2 | 3 | 4 | 5 |
| Rigidly codifying an ethical position that prevents certain types of actions could stand in the way of better human relations and adjustment. | 1 | 2 | 3 | 4 | 5 |
| No rule concerning lying can be formulated; whether a lie is permissible or not permissible totally depends upon the situation. | 1 | 2 | 3 | 4 | 5 |
| Whether a lie is judged to be moral or immoral depends upon the circumstances surrounding the action. | 1 | 2 | 3 | 4 | 5 |

**Demographics:** *Please circle one.*

Employment Category?
- Civilian
- Military - Active Duty
- Military - Guard
- Military - Reserve

If civilian, are you prior military?
- Yes
- No

Gender?
- Male
- Female

If military, which Branch of Service?
- Air Force
- Army
- Navy
- Marines
- Coast Guard

If military, what is your current rank or grade?
_____

Education Level?
- High School/GED
- Some College/Associates Degree
- Bachelor's Degree
- Graduate Degree
- Doctorate

Duty Title / Position Description? (i.e. Civil Engineer, Architect, Information Assurance Officer) _____

Number of years experience in this field? _____

Degree type for highest degree held? (i.e. Engineering, Computer Programming, etc.) _____

Do you currently hold a professional license or certification? Yes / No

If yes, which professional license(s) or certification(s)? _____

If no, do you plan to obtain a professional license or certification in the future? Yes / No

Which license(s)? _____

Additional comments/considerations: _____

# Appendix C. IRB Approval Memorandum

**DEPARTMENT OF THE AIR FORCE**
**AIR FORCE INSTITUTE OF TECHNOLOGY**
**WRIGHT-PATTERSON AIR FORCE BASE OHIO**

23 June 2014

MEMORANDUM FOR JOHN J. ELSHAW, PHD

FROM: William A. Cunningham, Ph.D.
AFIT IRB Research Reviewer
2950 Hobson Way
Wright-Patterson AFB, OH 45433-7765

SUBJECT: Approval for exemption request from human experimentation requirements (32 CFR 219, DoDD 3216.2 and AFI 40-402) for Research Proposal "The Influence of Personal Ethics and Organizational Behavior on the Decision to Obtain and Maintain Professional Licensure".

1. Your request was based on the Code of Federal Regulations, title 32, part 219, section 101, paragraph (b) (2) Research activities that involve the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior unless: (i) Information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) Any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

2. Your study qualifies for this exemption because you are not collecting sensitive data, which could reasonably damage the subjects' financial standing, employability, or reputation. Further, the demographic data you are collecting and the way that you plan to report it cannot realistically be expected to map a given response to a specific subject.

3. This determination pertains only to the Federal, Department of Defense, and Air Force regulations that govern the use of human subjects in research. Further, if a subject's future response reasonably places them at risk of criminal or civil liability or is damaging to their financial standing, employability, or reputation, you are required to file an adverse event report with this office immediately.

WILLIAM A. CUNNINGHAM, PH.D.
AFIT Exempt Determination Official

# Appendix D. Frequency and Correlation Tables

## Frequency Tables and Descriptive Statistics

### *Job Satisfaction Questions*

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Total | Mean |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | | |
| JS1 | 1 | 3 | 4 | 20 | 9 | 37 | 3.89 |
| JS2 | 1 | 5 | 4 | 21 | 6 | 37 | 3.70 |
| JS3 | 2 | 10 | 7 | 14 | 3 | 36 | 3.17 |
| JS4 | 9 | 17 | 8 | 2 | 1 | 37 | 2.16 |
| JS5 | 3 | 5 | 8 | 14 | 7 | 37 | 3.46 |
| JS6 | 0 | 7 | 10 | 14 | 6 | 37 | 3.51 |
| JS7 | 2 | 5 | 5 | 20 | 5 | 37 | 3.57 |
| JS8 | 0 | 1 | 4 | 24 | 8 | 37 | 4.05 |
| JS9 | 1 | 1 | 4 | 20 | 11 | 37 | 4.05 |
| JS10 | 3 | 2 | 7 | 20 | 5 | 37 | 3.59 |
| JS11 | 2 | 2 | 5 | 15 | 13 | 37 | 3.95 |
| JS12 | 0 | 4 | 1 | 15 | 17 | 37 | 4.22 |

### *Organization Commitment Questions*

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Total | Mean |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | | |
| OC1 | 4 | 6 | 5 | 10 | 12 | 37 | 3.54 |
| OC2 | 0 | 3 | 5 | 19 | 10 | 37 | 3.97 |
| OC3 | 4 | 11 | 7 | 12 | 3 | 37 | 2.97 |
| OC4 | 4 | 15 | 7 | 8 | 3 | 37 | 2.76 |
| OC5 | 1 | 3 | 10 | 15 | 8 | 37 | 3.70 |
| OC6 | 1 | 2 | 10 | 14 | 10 | 37 | 3.81 |
| OC7 | 1 | 6 | 4 | 18 | 8 | 37 | 3.70 |
| OC8 | 2 | 3 | 7 | 14 | 11 | 37 | 3.78 |
| OC9 | 5 | 5 | 6 | 13 | 8 | 37 | 3.38 |
| OC10 | 5 | 8 | 10 | 13 | 1 | 37 | 2.92 |
| OC11 | 6 | 13 | 7 | 9 | 2 | 37 | 2.68 |
| OC12 | 1 | 8 | 8 | 14 | 6 | 37 | 3.43 |
| OC13 | 2 | 6 | 5 | 20 | 4 | 37 | 3.49 |
| OC14 | 2 | 7 | 6 | 15 | 7 | 37 | 3.49 |
| OC15 | 7 | 8 | 3 | 13 | 6 | 37 | 3.08 |
| OC16 | 5 | 11 | 11 | 9 | 1 | 37 | 2.73 |
| OC17 | 2 | 10 | 10 | 9 | 5 | 36 | 3.14 |
| OC18 | 5 | 11 | 6 | 12 | 3 | 37 | 2.92 |
| OC19 | 3 | 13 | 5 | 13 | 3 | 37 | 3.00 |
| OC20 | 8 | 18 | 6 | 4 | 1 | 37 | 2.24 |
| OC21 | 8 | 18 | 7 | 4 | 0 | 37 | 2.19 |
| OC22 | 4 | 11 | 7 | 13 | 2 | 37 | 2.95 |

### *Ethical Theory Questions*

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Total | Median | Mode |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | | | |
| EQ1 | 6 | 7 | 11 | 7 | 5 | 36 | 3 | 3 |
| EQ2 | 6 | 5 | 6 | 13 | 6 | 36 | 4 | 4 |
| EQ3 | 2 | 9 | 11 | 10 | 4 | 36 | 3 | 3 |
| EQ4 | 5 | 6 | 12 | 10 | 3 | 36 | 3 | 3 |
| EQ5 | 2 | 1 | 4 | 13 | 16 | 36 | 4 | 5 |
| EQ6 | 3 | 4 | 12 | 13 | 4 | 36 | 3 | 4 |
| EQ7 | 2 | 2 | 5 | 16 | 11 | 36 | 4 | 4 |
| EQ8 | 14 | 7 | 11 | 4 | 0 | 36 | 2 | 1 |

### *Theory of Planned Behavior Questions*

| | Bad | | Neutral | | Good | Total | Mean |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | | |
| PB1 | 0 | 2 | 0 | 9 | 24 | 35 | 4.57 |
| | Worthless | | Neutral | | Useful | Total | |
| | (1) | (2) | (3) | (4) | (5) | | |
| PB2 | 1 | 1 | 2 | 8 | 22 | 34 | 4.44 |
| | Detrimental | | Neutral | | Advantageous | Total | |
| | (1) | (2) | (3) | (4) | (5) | | |
| PB3 | 0 | 0 | 1 | 10 | 23 | 34 | 4.65 |
| | Inconvenient | | Neutral | | Convenient | Total | |
| | (1) | (2) | (3) | (4) | (5) | | |
| PB4 | 7 | 11 | 4 | 6 | 5 | 33 | 2.73 |

| | Not Applicable | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Total | Mean |
|---|---|---|---|---|---|---|---|---|
| | (0) | (1) | (2) | (3) | (4) | (5) | | |
| PB5 | 1 | 2 | 6 | 7 | 12 | 9 | 37 | 3.46 |
| PB6 | 1 | 1 | 1 | 4 | 16 | 14 | 37 | 4.03 |
| PB7 | 1 | 1 | 3 | 3 | 18 | 11 | 37 | 3.86 |
| PB8 | 1 | 3 | 4 | 7 | 12 | 10 | 37 | 3.51 |
| PB9 | 2 | 0 | 2 | 3 | 17 | 13 | 37 | 3.95 |
| PB10 | 1 | 4 | 7 | 5 | 11 | 9 | 37 | 3.30 |
| PB11 | 1 | 0 | 3 | 1 | 17 | 15 | 37 | 4.11 |
| PB12 | 1 | 1 | 2 | 3 | 13 | 17 | 37 | 4.08 |
| PB13 | 1 | 2 | 1 | 5 | 13 | 15 | 37 | 3.95 |
| PB14 | 1 | 1 | 0 | 4 | 14 | 17 | 37 | 4.16 |
| PB15 | 1 | 3 | 7 | 6 | 14 | 6 | 37 | 3.27 |
| PB16 | 1 | 5 | 15 | 3 | 7 | 5 | 36 | 2.69 |
| PB17 | 1 | 4 | 3 | 3 | 10 | 16 | 37 | 3.76 |
| PB18 | 2 | 4 | 4 | 4 | 8 | 15 | 37 | 3.54 |
| PB19 | 2 | 4 | 2 | 4 | 10 | 15 | 37 | 3.65 |
| PB20 | 4 | 5 | 1 | 4 | 9 | 13 | 36 | 3.33 |
| PB21 | 9 | 3 | 8 | 2 | 7 | 8 | 37 | 2.51 |
| PB22 | 1 | 0 | 1 | 3 | 15 | 17 | 37 | 4.22 |
| PB23 | 1 | 12 | 16 | 3 | 3 | 2 | 37 | 2.03 |
| PB24 | 19 | 10 | 3 | 1 | 2 | 2 | 37 | 1.00 |

### *Ethical Theory Questions*

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Total | Mean |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | | |
| ES1 | 0 | 1 | 2 | 15 | 19 | 37 | 4.41 |
| ES2 | 5 | 14 | 7 | 6 | 5 | 37 | 2.78 |
| ES3 | 5 | 16 | 7 | 4 | 5 | 37 | 2.68 |
| ES4 | 1 | 6 | 3 | 15 | 12 | 37 | 3.84 |
| ES5 | 1 | 4 | 3 | 18 | 11 | 37 | 3.92 |
| ES6 | 1 | 5 | 4 | 15 | 12 | 37 | 3.86 |
| ES7 | 6 | 16 | 7 | 4 | 3 | 36 | 2.50 |
| ES8 | 2 | 6 | 8 | 13 | 8 | 37 | 3.51 |
| ES9 | 4 | 20 | 8 | 4 | 0 | 36 | 2.33 |
| ES10 | 1 | 12 | 10 | 10 | 4 | 37 | 3.11 |
| ES11 | 8 | 15 | 8 | 5 | 1 | 37 | 2.35 |
| ES12 | 6 | 2 | 6 | 17 | 6 | 37 | 3.41 |
| ES13 | 7 | 9 | 8 | 10 | 3 | 37 | 2.81 |
| ES14 | 4 | 8 | 5 | 17 | 3 | 37 | 3.19 |
| ES15 | 6 | 18 | 5 | 4 | 4 | 37 | 2.51 |
| ES16 | 6 | 16 | 5 | 9 | 1 | 37 | 2.54 |
| ES17 | 5 | 12 | 8 | 12 | 0 | 37 | 2.73 |
| ES18 | 3 | 9 | 6 | 17 | 2 | 37 | 3.16 |
| ES19 | 9 | 14 | 3 | 10 | 1 | 37 | 2.46 |
| ES20 | 8 | 7 | 6 | 16 | 0 | 37 | 2.81 |

### *Demographics*

| | Civilian | Active Duty | Guard | Reserve | Missing | Total |
|---|---|---|---|---|---|---|
| Employment Category | 3 | 28 | 1 | 4 | 1 | 37 |

| | Yes | No | Missing | Total |
|---|---|---|---|---|
| Prior Military | 2 | 1 | 0 | 3 |

| | Male | Female | Missing | Total |
|---|---|---|---|---|
| Gender | 33 | 2 | 2 | 37 |

| | Air Force | Army | Navy | Marines | Missing | Total |
|---|---|---|---|---|---|---|
| Branch of Service | 19 | 12 | 3 | 1 | 2 | 37 |

| | Officer | Enlisted | Warrant Officer | Missing | Total |
|---|---|---|---|---|---|
| Rank | 33 | 1 | 1 | 2 | 37 |

| | W3 | E9 | O2 | O3 | O4 | O5 | O6 | Missing | Total |
|---|---|---|---|---|---|---|---|---|---|
| Pay Grade | 1 | 1 | 1 | 15 | 12 | 3 | 1 | 0 | 34 |

| | High School/GED | Bachelor's | Master's | Doctorate | Missing | Total |
|---|---|---|---|---|---|---|
| Education Level | 1 | 19 | 15 | 1 | 1 | 37 |

| | Civil Engineer | Engineer | Construction Manager | Geospatial Engineer | Other | Missing | Total |
|---|---|---|---|---|---|---|---|
| Position | 19 | 3 | 1 | 1 | 9 | 4 | 37 |

| | Engineering | Architecture | Mgmt | Business | Other | Missing | Total |
|---|---|---|---|---|---|---|---|
| Degree Type | 20 | 1 | 3 | 1 | 7 | 5 | 37 |

| | Yes | No | Missing | Total |
|---|---|---|---|---|
| Hold a License | 9 | 27 | 1 | 37 |

| | PE | PMP | RA | LEED AP BD+C | EIT | Missing | Total |
|---|---|---|---|---|---|---|---|
| Which Cert do you hold | 5 | 1 | 1 | 2 | 2 | 0 | 11 |

| | Yes | No | Missing | Total |
|---|---|---|---|---|
| Plan Cert | 22 | 9 | 6 | 37 |

| | PE | PMP | CFM | GEOINT | CCM | Missing | Total |
|---|---|---|---|---|---|---|---|
| Which cert to obtain | 16 | 12 | 4 | 1 | 1 | | |

## Appendix E. ANOVA Output

### ToPB and Military Department

**Warnings**

Post hoc tests are not performed for: ToPB - Attitude because at least one group has fewer than two cases.
Post hoc tests are not performed for: ToPB - Norms because at least one group has fewer than two cases.
Post hoc tests are not performed for: ToPB - Control because at least one group has fewer than two cases.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| ToPB - Attitude | Between Groups | 5.568 | 3 | 1.856 | 1.503 | .233 |
| | Within Groups | 38.279 | 31 | 1.235 | | |
| | Total | 43.846 | 34 | | | |
| ToPB - Norms | Between Groups | 2.551 | 3 | .850 | .752 | .529 |
| | Within Groups | 35.049 | 31 | 1.131 | | |
| | Total | 37.600 | 34 | | | |
| ToPB - Control | Between Groups | 5.026 | 3 | 1.675 | 1.616 | .206 |
| | Within Groups | 32.145 | 31 | 1.037 | | |
| | Total | 37.171 | 34 | | | |

**ToPB and Education Level**

**Warnings**

Post hoc tests are not performed for: ToPB - Attitude because at least one group has fewer than two cases.
Post hoc tests are not performed for: ToPB - Norms because at least one group has fewer than two cases.
Post hoc tests are not performed for: ToPB - Control because at least one group has fewer than two cases.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| ToPB - Attitude | Between Groups | 4.817 | 3 | 1.606 | 1.313 | .287 |
| | Within Groups | 39.135 | 32 | 1.223 | | |
| | Total | 43.951 | 35 | | | |
| ToPB - Norms | Between Groups | 1.506 | 3 | .502 | .428 | .734 |
| | Within Groups | 37.491 | 32 | 1.172 | | |
| | Total | 38.997 | 35 | | | |
| ToPB - Control | Between Groups | 4.923 | 3 | 1.641 | 1.625 | .203 |
| | Within Groups | 32.320 | 32 | 1.010 | | |
| | Total | 37.243 | 35 | | | |

**ToPB and Degree Type**

**Warnings**

Post hoc tests are not performed for: ToPB - Attitude because at least one group has fewer than two cases.
Post hoc tests are not performed for: ToPB - Norms because at least one group has fewer than two cases.
Post hoc tests are not performed for: ToPB - Control because at least one group has fewer than two cases.

**ANOVA**

| | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| ToPB - Attitude | Between Groups | 3.287 | 4 | .822 | .840 | .512 |
| | Within Groups | 26.399 | 27 | .978 | | |
| | Total | 29.686 | 31 | | | |
| ToPB - Norms | Between Groups | .927 | 4 | .232 | .327 | .858 |
| | Within Groups | 19.153 | 27 | .709 | | |
| | Total | 20.080 | 31 | | | |
| ToPB - Control | Between Groups | 1.914 | 4 | .478 | .598 | .667 |
| | Within Groups | 21.615 | 27 | .801 | | |
| | Total | 23.529 | 31 | | | |

## Appendix F. Factor Analysis Statistics Output

### Exploratory Factor Analysis

#### *Attitude toward a Behavior – Test One*

**Descriptive Statistics**

| | Mean | Std. Deviation | Analysis N |
|---|---|---|---|
| PB1 - Attitude | 4.58 | .792 | 33 |
| PB2 - Attitude | 4.42 | .969 | 33 |
| PB3 - Attitude | 4.64 | .549 | 33 |
| PB4 - Attitude | 2.73 | 1.398 | 33 |
| PB5 - Attitude | 3.52 | 1.278 | 33 |
| PB6 - Attitude | 4.06 | 1.059 | 33 |
| PB7 - Attitude | 3.94 | 1.059 | 33 |
| PB8 - Attitude | 3.64 | 1.342 | 33 |

**Correlation Matrix**

| | PB1 | PB2 | PB3 | PB4 | PB5 | PB6 | PB7 | PB8 |
|---|---|---|---|---|---|---|---|---|
| Correlation | | | | | | | | |
| PB1 - Attitude | 1.000 | | | | | | | |
| PB2 - Attitude | .893 | 1.000 | | | | | | |
| PB3 - Attitude | .785 | .828 | 1.000 | | | | | |
| PB4 - Attitude | .231 | .157 | .193 | 1.000 | | | | |
| PB5 - Attitude | .501 | .550 | .632 | .256 | 1.000 | | | |
| PB6 - Attitude | .479 | .370 | .523 | .054 | .715 | 1.000 | | |
| PB7 - Attitude | .192 | .148 | .445 | .178 | .694 | .700 | 1.000 | |
| PB8 - Attitude | .615 | .579 | .706 | .012 | .732 | .764 | .666 | 1.000 |

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .760 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 207.125 |
| | df | 28 |
| | Sig. | .000 |

**Communalities**[a]

| | Initial | Extraction |
|---|---|---|
| PB1 - Attitude | .865 | .823 |
| PB2 - Attitude | .896 | .991 |
| PB3 - Attitude | .802 | .799 |
| PB4 - Attitude | .302 | .243 |
| PB5 - Attitude | .760 | .751 |
| PB6 - Attitude | .728 | .708 |
| PB7 - Attitude | .742 | .875 |
| PB8 - Attitude | .781 | .909 |

Extraction Method: Maximum Likelihood.

a. One or more communality estimates greater than 1 were encountered during iterations. The resulting solution should be interpreted with caution.

**Total Variance Explained**

| Factor | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings[a] |
|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total |
| 1 | 4.654 | 58.169 | 58.169 | 3.582 | 44.769 | 44.769 | 3.552 |
| 2 | 1.392 | 17.397 | 75.566 | 2.137 | 26.717 | 71.486 | 3.583 |
| 3 | 1.014 | 12.675 | 88.241 | .379 | 4.743 | 76.230 | .613 |
| 4 | .319 | 3.983 | 92.224 | | | | |
| 5 | .267 | 3.336 | 95.560 | | | | |
| 6 | .173 | 2.168 | 97.728 | | | | |
| 7 | .123 | 1.543 | 99.270 | | | | |
| 8 | .058 | .730 | 100.000 | | | | |

Extraction Method: Maximum Likelihood.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

**Pattern Matrix[a]**

| | Factor | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| PB2 - Attitude | 1.022 | -.103 | .087 |
| PB1 - Attitude | .897 | .027 | -.012 |
| PB3 - Attitude | .715 | .273 | .103 |
| PB7 - Attitude | -.245 | .965 | .185 |
| PB6 - Attitude | .101 | .807 | -.104 |
| PB8 - Attitude | .359 | .759 | -.254 |
| PB5 - Attitude | .275 | .646 | .195 |
| PB4 - Attitude | .060 | .012 | .478 |

Extraction Method: Maximum Likelihood.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 5 iterations.

**Factor Correlation Matrix**

| Factor | 1 | 2 | 3 |
|---|---|---|---|
| 1 | 1.000 | | |
| 2 | .440 | 1.000 | |
| 3 | .137 | .196 | 1.000 |

Extraction Method: Maximum Likelihood.
Rotation Method: Oblimin with Kaiser Normalization.

## *Attitude toward a Behavior – Test Two*

**Descriptive Statistics**

| | Mean | Std. Deviation | Analysis N |
|---|---|---|---|
| PB5 - Attitude | 3.46 | 1.325 | 37 |
| PB6 - Attitude | 4.03 | 1.142 | 37 |
| PB7 - Attitude | 3.86 | 1.182 | 37 |
| PB8 - Attitude | 3.51 | 1.367 | 37 |

**Correlation Matrix**

| | | PB5 | PB6 | PB7 | PB8 |
|---|---|---|---|---|---|
| Correlation | PB5 - Attitude | 1.000 | | | |
| | PB6 - Attitude | .744 | 1.000 | | |
| | PB7 - Attitude | .750 | .743 | 1.000 | |
| | PB8 - Attitude | .756 | .756 | .697 | 1.000 |

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .851 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 98.523 |
| | df | 6 |
| | Sig. | .000 |

**Communalities**

| | Initial | Extraction |
|---|---|---|
| PB5 - Attitude | .687 | .765 |
| PB6 - Attitude | .681 | .757 |
| PB7 - Attitude | .647 | .712 |
| PB8 - Attitude | .662 | .732 |

Extraction Method: Maximum Likelihood.

**Total Variance Explained**

| Factor | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.224 | 80.588 | 80.588 | 2.966 | 74.140 | 74.140 |
| 2 | .303 | 7.585 | 88.172 | | | |
| 3 | .256 | 6.393 | 94.565 | | | |
| 4 | .217 | 5.435 | 100.000 | | | |

Extraction Method: Maximum Likelihood.

**Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| PB5 - Attitude | .874 |
| PB6 - Attitude | .870 |
| PB8 - Attitude | .855 |
| PB7 - Attitude | .844 |

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 3 iterations required.

### *Subjective Norms*

**Descriptive Statistics**

| | Mean | Std. Deviation | Analysis N |
|---|---|---|---|
| PB9 - Norms | 3.95 | 1.246 | 37 |
| PB10 - Norms | 3.30 | 1.450 | 37 |
| PB11 - Norms | 4.11 | 1.100 | 37 |
| PB12 - Norms | 4.08 | 1.211 | 37 |

**Correlation Matrix**

| | | PB9 - Norms | PB10 - Norms | PB11 - Norms | PB12 - Norms (Reverse Coded) |
|---|---|---|---|---|---|
| Correlation | PB9 - Norms | 1.000 | | | |
| | PB10 - Norms | .547 | 1.000 | | |
| | PB11 - Norms | .572 | .693 | 1.000 | |
| | PB12 - Norms | .334 | .350 | .577 | 1.000 |

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .721 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 51.810 |
| | df | 6 |
| | Sig. | .000 |

**Communalities**[a]

| | Initial | Extraction |
|---|---|---|
| PB9 - Norms | .371 | .382 |
| PB10 - Norms | .518 | .539 |
| PB11 - Norms | .636 | .896 |
| PB12 - Norms | .339 | .349 |

Extraction Method: Maximum Likelihood.

a. One or more communality estimates greater than 1 were encountered during iterations. The resulting solution should be interpreted with caution.

**Total Variance Explained**

| Factor | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 2.558 | 63.946 | 63.946 | 2.166 | 54.152 | 54.152 |
| 2 | .722 | 18.041 | 81.988 | | | |
| 3 | .473 | 11.816 | 93.803 | | | |
| 4 | .248 | 6.197 | 100.000 | | | |

Extraction Method: Maximum Likelihood.

**Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| PB11 - Norms | .947 |
| PB10 - Norms | .734 |
| PB9 - Norms | .618 |
| PB12 - Norms | .591 |

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 10 iterations required.

### *Control over a Behavior*

**Descriptive Statistics**

| | Mean | Std. Deviation | Analysis N |
|---|---|---|---|
| PB13 - Control | 3.94 | 1.286 | 36 |
| PB14 - Control | 4.17 | 1.134 | 36 |
| PB15 - Control | 3.25 | 1.339 | 36 |
| PB16 - Control | 2.69 | 1.390 | 36 |

**Correlation Matrix**

| | | PB13 - Control | PB14 - Control | PB15 - Control (Reverse Coded) | PB16 - Control (Reverse Coded) |
|---|---|---|---|---|---|
| Correlation | PB13 - Control | 1.000 | | | |
| | PB14 - Control | .516 | 1.000 | | |
| | PB15 - Control | .738 | .405 | 1.000 | |
| | PB16 - Control | .677 | .450 | .579 | 1.000 |

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .774 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 57.897 |
| | df | 6 |
| | Sig. | .000 |

**Communalities**

| | Initial | Extraction |
|---|---|---|
| PB13 - Control | .663 | .865 |
| PB14 - Control | .285 | .307 |
| PB15 - Control | .557 | .623 |
| PB16 - Control | .485 | .538 |

Extraction Method: Maximum Likelihood.

**Total Variance Explained**

| Factor | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 2.702 | 67.545 | 67.545 | 2.335 | 58.364 | 58.364 |
| 2 | .641 | 16.035 | 83.580 | | | |
| 3 | .423 | 10.569 | 94.149 | | | |
| 4 | .234 | 5.851 | 100.000 | | | |

Extraction Method: Maximum Likelihood.

**Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| PB13 - Control | .930 |
| PB15 - Control | .790 |
| PB16 - Control | .734 |
| PB14 - Control | .554 |

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 5 iterations required.

### *Intention to Perform a Behavior*

**Descriptive Statistics**

| | Mean | Std. Deviation | Analysis N |
|---|---|---|---|
| PB17 - Intention | 3.72 | 1.504 | 36 |
| PB18 - Intention | 3.50 | 1.630 | 36 |
| PB19 - Intention | 3.61 | 1.591 | 36 |
| PB20 - Intention | 3.33 | 1.805 | 36 |

**Correlation Matrix**

| | | PB17 - Intention | PB18 - Intention | PB19 - Intention | PB20 - Intention |
|---|---|---|---|---|---|
| Correlation | PB17 - Intention | 1.000 | | | |
| | PB18 - Intention | .839 | 1.000 | | |
| | PB19 - Intention | .825 | .672 | 1.000 | |
| | PB20 - Intention | .582 | .670 | .723 | 1.000 |

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .609 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 112.511 |
| | df | 6 |
| | Sig. | .000 |

**Communalities**

| | Initial | Extraction |
|---|---|---|
| PB17 - Intention | .857 | .895 |
| PB18 - Intention | .786 | .754 |
| PB19 - Intention | .801 | .741 |
| PB20 - Intention | .655 | .481 |

Extraction Method: Maximum Likelihood.

**Total Variance Explained**

| Factor | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 3.160 | 79.000 | 79.000 | 2.870 | 71.757 | 71.757 |
| 2 | .451 | 11.275 | 90.275 | | | |
| 3 | .317 | 7.927 | 98.202 | | | |
| 4 | .072 | 1.798 | 100.000 | | | |

Extraction Method: Maximum Likelihood.

**Factor Matrix[a]**

| | Factor |
|---|---|
| | 1 |
| PB17 - Intention | .946 |
| PB18 - Intention | .868 |
| PB19 - Intention | .861 |
| PB20 - Intention | .693 |

Extraction Method: Maximum Likelihood.
a. 1 factors extracted. 5 iterations required.

## Confirmatory Factor Analysis

### *Theory of Planned Behavior – Test One*

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .808 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 436.637 |
| | df | 120 |
| | Sig. | .000 |

**Communalities**

| | Initial | Extraction |
|---|---|---|
| PB5 - Attitude | .837 | .814 |
| PB6 - Attitude | .871 | .838 |
| PB7 - Attitude | .789 | .715 |
| PB8 - Attitude | .805 | .817 |
| PB9 - Norms | .834 | .733 |
| PB10 - Norms | .603 | .544 |
| PB11 - Norms | .730 | .780 |
| PB12 - Norms | .670 | .457 |
| PB13 - Control | .808 | .709 |
| PB14 - Control | .505 | .398 |
| PB15 - Control | .701 | .678 |
| PB16 - Control | .691 | .774 |
| PB17 - Intention | .926 | .913 |
| PB18 - Intention | .904 | .754 |
| PB19 - Intention | .834 | .790 |
| PB20 - Intention | .772 | .827 |

Extraction Method: Maximum Likelihood.

**Goodness-of-fit Test**

| Chi-Square | df | Sig. |
|---|---|---|
| 61.770 | 62 | .484 |

**Correlation Matrix**

| | | PB5 | PB6 | PB7 | PB8 | PB9 | PB10 | PB11 | PB12 | PB13 | PB14 | PB15 | PB16 | PB17 | PB18 | PB19 | PB20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Correlation | PB5 - Attitude | 1.000 | | | | | | | | | | | | | | | |
| | PB6 - Attitude | .744 | 1.000 | | | | | | | | | | | | | | |
| | PB7 - Attitude | .750 | .743 | 1.000 | | | | | | | | | | | | | |
| | PB8 - Attitude | .756 | .756 | .697 | 1.000 | | | | | | | | | | | | |
| | PB9 - Norms | .739 | .801 | .749 | .637 | 1.000 | | | | | | | | | | | |
| | PB10 - Norms | .549 | .498 | .542 | .467 | .547 | 1.000 | | | | | | | | | | |
| | PB11 - Norms | .518 | .639 | .588 | .479 | .572 | .693 | 1.000 | | | | | | | | | |
| | PB12 - Norms | .357 | .541 | .435 | .427 | .334 | .350 | .577 | 1.000 | | | | | | | | |
| | PB13 - Control | .627 | .442 | .495 | .417 | .649 | .447 | .442 | .311 | 1.000 | | | | | | | |
| | PB14 - Control | .529 | .518 | .521 | .435 | .445 | .312 | .505 | .339 | .516 | 1.000 | | | | | | |
| | PB15 - Control | .528 | .527 | .555 | .366 | .631 | .477 | .436 | .332 | .736 | .400 | 1.000 | | | | | |
| | PB16 - Control | .568 | .360 | .393 | .243 | .462 | .449 | .428 | .133 | .677 | .450 | .579 | 1.000 | | | | |
| | PB17 - Intention | .660 | .604 | .577 | .510 | .677 | .379 | .337 | .226 | .695 | .422 | .719 | .545 | 1.000 | | | |
| | PB18 - Intention | .616 | .545 | .588 | .372 | .550 | .319 | .293 | .415 | .580 | .332 | .652 | .447 | .842 | 1.000 | | |
| | PB19 - Intention | .476 | .527 | .493 | .393 | .553 | .240 | .245 | .146 | .557 | .315 | .588 | .346 | .829 | .679 | 1.000 | |
| | PB20 - Intention | .276 | .428 | .334 | .172 | .430 | .209 | .229 | .290 | .410 | .145 | .481 | .096 | .582 | .670 | .723 | 1.000 |

**Total Variance Explained**

| Factor | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 8.538 | 53.363 | 53.363 | 8.195 | 51.220 | 51.220 | 3.401 | 21.254 | 21.254 |
| 2 | 1.859 | 11.620 | 64.983 | 1.677 | 10.484 | 61.704 | 3.111 | 19.444 | 40.698 |
| 3 | 1.247 | 7.791 | 72.774 | .985 | 6.157 | 67.861 | 2.664 | 16.649 | 57.347 |
| 4 | .941 | 5.882 | 78.656 | .684 | 4.277 | 72.138 | 2.367 | 14.791 | 72.138 |
| 5 | .734 | 4.587 | 83.243 | | | | | | |
| 6 | .544 | 3.401 | 86.643 | | | | | | |
| 7 | .401 | 2.504 | 89.148 | | | | | | |
| 8 | .349 | 2.184 | 91.331 | | | | | | |
| 9 | .330 | 2.064 | 93.395 | | | | | | |
| 10 | .286 | 1.789 | 95.185 | | | | | | |
| 11 | .226 | 1.415 | 96.600 | | | | | | |
| 12 | .183 | 1.145 | 97.745 | | | | | | |
| 13 | .152 | .950 | 98.695 | | | | | | |
| 14 | .109 | .679 | 99.374 | | | | | | |
| 15 | .065 | .407 | 99.781 | | | | | | |
| 16 | .035 | .219 | 100.000 | | | | | | |

Extraction Method: Maximum Likelihood.

**Rotated Factor Matrix[a]**

| | Factor | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| PB20 - Intention | .870 | -.005 | -.049 | .259 |
| PB19 - Intention | .811 | .283 | .227 | .032 |
| PB18 - Intention | .734 | .286 | .346 | .121 |
| PB17 - Intention | .718 | .414 | .474 | .021 |
| PB8 - Attitude | .132 | .844 | .107 | .277 |
| PB5 - Attitude | .242 | .702 | .440 | .264 |
| PB6 - Attitude | .351 | .665 | .139 | .504 |
| PB7 - Attitude | .290 | .621 | .259 | .422 |
| PB9 - Norms | .387 | .556 | .343 | .396 |
| PB16 - Control | .119 | .145 | .846 | .150 |
| PB13 - Control | .410 | .227 | .665 | .218 |
| PB15 - Control | .516 | .190 | .549 | .273 |
| PB14 - Control | .110 | .356 | .393 | .323 |
| PB11 - Norms | .063 | .264 | .309 | .782 |
| PB12 - Norms | .165 | .234 | .011 | .613 |
| PB10 - Norms | .080 | .278 | .384 | .559 |

Extraction Method: Maximum Likelihood.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

**Factor Transformation Matrix**

| Factor | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | .599 | .556 | .458 | .349 |
| 2 | -.731 | .466 | .011 | .497 |
| 3 | -.309 | -.241 | .886 | -.248 |
| 4 | .103 | -.644 | .072 | .754 |

Extraction Method: Maximum Likelihood.
Rotation Method: Varimax with Kaiser Normalization.

## *Theory of Planned Behavior – Test Two*

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .806 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 391.363 |
| | df | 105 |
| | Sig. | .000 |

**Communalities**

| | Initial | Extraction |
|---|---|---|
| PB5 - Attitude | .835 | .813 |
| PB6 - Attitude | .816 | .808 |
| PB7 - Attitude | .749 | .702 |
| PB8 - Attitude | .794 | .861 |
| PB10 - Norms | .602 | .543 |
| PB11 - Norms | .730 | .800 |
| PB12 - Norms | .660 | .482 |
| PB13 - Control | .767 | .691 |
| PB14 - Control | .467 | .403 |
| PB15 - Control | .701 | .667 |
| PB16 - Control | .684 | .802 |
| PB17 - Intention | .920 | .912 |
| PB18 - Intention | .898 | .763 |
| PB19 - Intention | .825 | .787 |
| PB20 - Intention | .769 | .810 |

Extraction Method: Maximum Likelihood.

**Total Variance Explained**

| Factor | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 7.832 | 52.211 | 52.211 | 7.497 | 49.982 | 49.982 | 3.332 | 22.213 | 22.213 |
| 2 | 1.855 | 12.366 | 64.578 | 1.645 | 10.967 | 60.950 | 2.606 | 17.372 | 39.585 |
| 3 | 1.245 | 8.303 | 72.881 | .994 | 6.627 | 67.576 | 2.547 | 16.981 | 56.566 |
| 4 | .922 | 6.147 | 79.028 | .708 | 4.721 | 72.298 | 2.360 | 15.732 | 72.298 |
| 5 | .709 | 4.725 | 83.752 | | | | | | |
| 6 | .539 | 3.590 | 87.342 | | | | | | |
| 7 | .380 | 2.533 | 89.875 | | | | | | |
| 8 | .338 | 2.251 | 92.126 | | | | | | |
| 9 | .308 | 2.051 | 94.177 | | | | | | |
| 10 | .242 | 1.615 | 95.792 | | | | | | |
| 11 | .220 | 1.466 | 97.258 | | | | | | |
| 12 | .163 | 1.085 | 98.343 | | | | | | |
| 13 | .109 | .726 | 99.069 | | | | | | |
| 14 | .101 | .674 | 99.743 | | | | | | |
| 15 | .039 | .257 | 100.000 | | | | | | |

Extraction Method: Maximum Likelihood.

**Rotated Factor Matrix[a]**

| | Factor | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| PB20 - Intention | .863 | -.020 | -.054 | .249 |
| PB19 - Intention | .814 | .270 | .224 | .042 |
| PB18 - Intention | .746 | .262 | .343 | .139 |
| PB17 - Intention | .731 | .396 | .469 | .041 |
| PB8 - Attitude | .141 | .859 | .103 | .304 |
| PB5 - Attitude | .256 | .681 | .449 | .287 |
| PB6 - Attitude | .361 | .621 | .155 | .517 |
| PB7 - Attitude | .306 | .587 | .263 | .441 |
| PB16 - Control | .126 | .121 | .865 | .155 |
| PB13 - Control | .418 | .221 | .649 | .218 |
| PB15 - Control | .526 | .170 | .536 | .273 |
| PB14 - Control | .121 | .336 | .396 | .343 |
| PB11 - Norms | .071 | .228 | .308 | .805 |
| PB12 - Norms | .173 | .222 | .003 | .634 |
| PB10 - Norms | .088 | .260 | .378 | .570 |

Extraction Method: Maximum Likelihood.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

**Goodness-of-fit Test**

| Chi-Square | df | Sig. |
|---|---|---|
| 48.137 | 51 | .588 |

**Factor Transformation Matrix**

| Factor | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1 | .605 | .535 | .467 | .360 |
| 2 | -.713 | .481 | -.020 | .510 |
| 3 | -.321 | -.343 | .878 | -.091 |
| 4 | .150 | -.604 | -.101 | .776 |

Extraction Method: Maximum Likelihood.
Rotation Method: Varimax with Kaiser Normalization.

## Appendix G. Structural Equation Modeling Output

### Analysis Summary

Notes for Group (Group number 1)

The model is recursive.

Sample size = 37

Your model contains the following variables (Group number 1)

Observed, endogenous variables:

| | | | |
|---|---|---|---|
| PB16r | PB18 | PB20 | PB5 |
| PB6 | PB7 | PB8 | PB13 |
| PB14 | PB15r | PB10 | PB11 |
| PB12r | PB19 | PB17 | |

Unobserved, endogenous variables:

Intention

Unobserved, exogenous variables:

| | | | |
|---|---|---|---|
| Attitude | Norms | Control | e1 |
| e2 | e3 | e4 | e8 |
| e9 | e10 | e11 | e5 |
| e6 | e7 | e16 | e12 |
| e13 | e14 | e15 | |

Variable counts (Group number 1)

| | |
|---|---|
| Number of variables in your model: | 35 |
| Number of observed variables: | 15 |
| Number of unobserved variables: | 20 |
| Number of exogenous variables: | 19 |
| Number of endogenous variables: | 16 |

Parameter summary (Group number 1)

| | Weights | Covariances | Variances | Means | Intercepts | Total |
|---|---|---|---|---|---|---|
| Fixed | 20 | 0 | 0 | 0 | 0 | 20 |
| Labeled | 0 | 0 | 0 | 0 | 0 | 0 |
| Unlabeled | 14 | 3 | 19 | 0 | 15 | 51 |
| Total | 34 | 3 | 19 | 0 | 15 | 71 |

**Models**

Default model (Default model)

Computation of degrees of freedom (Default model)

| | |
|---|---|
| Number of distinct sample moments: | 135 |
| Number of distinct parameters to be estimated: | 51 |
| Degrees of freedom (135 - 51): | 84 |

Result (Default model)

Minimum was achieved

Chi-square = 114.017

Degrees of freedom = 84

Probability level = .016

Regression Weights: (Group number 1 - Default model)

| | | | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|---|---|
| Intention | <--- | Norms | -.598 | .283 | -2.112 | .035 | |
| Intention | <--- | Attitude | .683 | .272 | 2.512 | .012 | |
| Intention | <--- | Control | .945 | .246 | 3.848 | *** | |
| PB16r | <--- | Control | .892 | .180 | 4.957 | *** | |
| PB18 | <--- | Intention | .954 | .107 | 8.898 | *** | |
| PB20 | <--- | Intention | .770 | .169 | 4.564 | *** | |
| PB5 | <--- | Attitude | 1.000 | | | | |
| PB6 | <--- | Attitude | .876 | .119 | 7.332 | *** | |
| PB8 | <--- | Attitude | .977 | .152 | 6.434 | *** | |
| PB7 | <--- | Attitude | .873 | .128 | 6.824 | *** | |
| PB13 | <--- | Control | 1.000 | | | | |
| PB14 | <--- | Control | .569 | .157 | 3.634 | *** | |
| PB15r | <--- | Control | 1.002 | .156 | 6.406 | *** | |
| PB10 | <--- | Norms | 1.000 | | | | |
| PB11 | <--- | Norms | .912 | .179 | 5.101 | *** | |
| PB12r | <--- | Norms | .673 | .189 | 3.569 | *** | |
| PB19 | <--- | Intention | .912 | .108 | 8.425 | *** | |
| PB17 | <--- | Intention | 1.000 | | | | |

Standardized Regression Weights: (Group number 1 - Default model)

| | | | Estimate |
|---|---|---|---|
| Intention | <--- | Norms | -.447 |
| Intention | <--- | Attitude | .538 |
| Intention | <--- | Control | .718 |
| PB16r | <--- | Control | .719 |
| PB18 | <--- | Intention | .860 |
| PB20 | <--- | Intention | .627 |
| PB5 | <--- | Attitude | .872 |
| PB6 | <--- | Attitude | .886 |
| PB8 | <--- | Attitude | .826 |
| PB7 | <--- | Attitude | .853 |
| PB13 | <--- | Control | .878 |
| PB14 | <--- | Control | .567 |
| PB15r | <--- | Control | .841 |
| PB10 | <--- | Norms | .755 |
| PB11 | <--- | Norms | .908 |
| PB12r | <--- | Norms | .609 |
| PB19 | <--- | Intention | .844 |
| PB17 | <--- | Intention | .979 |

Intercepts: (Group number 1 - Default model)

| | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|
| PB10 | 3.297 | .238 | 13.829 | *** | |
| PB11 | 4.108 | .181 | 22.715 | *** | |
| PB12r | 4.081 | .199 | 20.506 | *** | |
| PB13 | 3.946 | .208 | 18.928 | *** | |
| PB14 | 4.162 | .184 | 22.638 | *** | |
| PB15r | 3.270 | .218 | 15.002 | *** | |
| PB16r | 2.701 | .229 | 11.809 | *** | |
| PB20 | 3.360 | .301 | 11.176 | *** | |
| PB18 | 3.541 | .271 | 13.088 | *** | |
| PB17 | 3.757 | .251 | 14.970 | *** | |
| PB19 | 3.649 | .264 | 13.844 | *** | |
| PB8 | 3.514 | .225 | 15.638 | *** | |
| PB7 | 3.865 | .194 | 19.884 | *** | |
| PB6 | 4.027 | .188 | 21.444 | *** | |
| PB5 | 3.459 | .213 | 16.219 | *** | |

Covariances: (Group number 1 - Default model)

| | | | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|---|---|
| Attitude | <--> | Norms | .918 | .319 | 2.879 | .004 | |
| Control | <--> | Attitude | .863 | .290 | 2.980 | .003 | |
| Control | <--> | Norms | .742 | .287 | 2.587 | .010 | |

Correlations: (Group number 1 - Default model)

| | | | Estimate |
|---|---|---|---|
| Attitude | <--> | Norms | .745 |
| Control | <--> | Attitude | .689 |
| Control | <--> | Norms | .625 |

Variances: (Group number 1 - Default model)

| | Estimate | S.E. | C.R. | P | Label |
|---|---|---|---|---|---|
| Attitude | 1.299 | .399 | 3.255 | .001 | |
| Norms | 1.168 | .461 | 2.531 | .011 | |
| Control | 1.206 | .373 | 3.236 | .001 | |
| e16 | .465 | .203 | 2.287 | .022 | |
| e1 | .408 | .126 | 3.246 | .001 | |
| e2 | .272 | .088 | 3.093 | .002 | |
| e3 | .370 | .109 | 3.408 | *** | |
| e4 | .578 | .162 | 3.576 | *** | |
| e8 | .359 | .131 | 2.733 | .006 | |
| e9 | .826 | .205 | 4.040 | *** | |
| e10 | .500 | .158 | 3.157 | .002 | |
| e11 | .897 | .241 | 3.729 | *** | |
| e5 | .879 | .257 | 3.422 | *** | |
| e6 | .207 | .126 | 1.642 | .101 | |
| e7 | .896 | .229 | 3.912 | *** | |
| e12 | .092 | .091 | 1.003 | .316 | |
| e13 | .669 | .182 | 3.677 | *** | |
| e14 | .703 | .186 | 3.769 | *** | |
| e15 | 1.919 | .469 | 4.089 | *** | |

Squared Multiple Correlations: (Group number 1 - Default model)

| | Estimate |
|---|---|
| Intention | .778 |
| PB17 | .958 |
| PB19 | .712 |
| PB12r | .371 |
| PB11 | .824 |
| PB10 | .570 |
| PB15r | .708 |
| PB14 | .321 |
| PB13 | .771 |
| PB8 | .682 |
| PB7 | .728 |
| PB6 | .786 |
| PB5 | .761 |
| PB20 | .393 |
| PB18 | .740 |
| PB16r | .517 |

Total Effects (Group number 1 - Default model)

| | Norms | Attitude | Control | Intention |
|---|---|---|---|---|
| Intention | -.598 | .683 | .945 | .000 |
| PB17 | -.598 | .683 | .945 | 1.000 |
| PB19 | -.545 | .623 | .863 | .912 |
| PB12r | .673 | .000 | .000 | .000 |
| PB11 | .912 | .000 | .000 | .000 |
| PB10 | 1.000 | .000 | .000 | .000 |
| PB15r | .000 | .000 | 1.002 | .000 |
| PB14 | .000 | .000 | .569 | .000 |
| PB13 | .000 | .000 | 1.000 | .000 |
| PB8 | .000 | .977 | .000 | .000 |
| PB7 | .000 | .873 | .000 | .000 |
| PB6 | .000 | .876 | .000 | .000 |
| PB5 | .000 | 1.000 | .000 | .000 |
| PB20 | -.460 | .526 | .728 | .770 |
| PB18 | -.570 | .651 | .902 | .954 |
| PB16r | .000 | .000 | .892 | .000 |

Standardized Total Effects (Group number 1 - Default model)

| | Norms | Attitude | Control | Intention |
|---|---|---|---|---|
| Intention | -.447 | .538 | .718 | .000 |
| PB17 | -.437 | .527 | .703 | .979 |
| PB19 | -.377 | .454 | .606 | .844 |
| PB12r | .609 | .000 | .000 | .000 |
| PB11 | .908 | .000 | .000 | .000 |
| PB10 | .755 | .000 | .000 | .000 |
| PB15r | .000 | .000 | .841 | .000 |
| PB14 | .000 | .000 | .567 | .000 |
| PB13 | .000 | .000 | .878 | .000 |
| PB8 | .000 | .826 | .000 | .000 |
| PB7 | .000 | .853 | .000 | .000 |
| PB6 | .000 | .886 | .000 | .000 |
| PB5 | .000 | .872 | .000 | .000 |
| PB20 | -.280 | .337 | .450 | .627 |
| PB18 | -.384 | .463 | .617 | .860 |
| PB16r | .000 | .000 | .719 | .000 |

Direct Effects (Group number 1 - Default model)

| | Norms | Attitude | Control | Intention |
|---|---|---|---|---|
| Intention | -.598 | .683 | .945 | .000 |
| PB17 | .000 | .000 | .000 | 1.000 |
| PB19 | .000 | .000 | .000 | .912 |
| PB12r | .673 | .000 | .000 | .000 |
| PB11 | .912 | .000 | .000 | .000 |
| PB10 | 1.000 | .000 | .000 | .000 |
| PB15r | .000 | .000 | 1.002 | .000 |
| PB14 | .000 | .000 | .569 | .000 |
| PB13 | .000 | .000 | 1.000 | .000 |
| PB8 | .000 | .977 | .000 | .000 |
| PB7 | .000 | .873 | .000 | .000 |
| PB6 | .000 | .876 | .000 | .000 |
| PB5 | .000 | 1.000 | .000 | .000 |
| PB20 | .000 | .000 | .000 | .770 |
| PB18 | .000 | .000 | .000 | .954 |
| PB16r | .000 | .000 | .892 | .000 |

Standardized Direct Effects (Group number 1 - Default model)

| | Norms | Attitude | Control | Intention |
|---|---|---|---|---|
| Intention | -.447 | .538 | .718 | .000 |
| PB17 | .000 | .000 | .000 | .979 |
| PB19 | .000 | .000 | .000 | .844 |
| PB12r | .609 | .000 | .000 | .000 |
| PB11 | .908 | .000 | .000 | .000 |
| PB10 | .755 | .000 | .000 | .000 |
| PB15r | .000 | .000 | .841 | .000 |
| PB14 | .000 | .000 | .567 | .000 |
| PB13 | .000 | .000 | .878 | .000 |
| PB8 | .000 | .826 | .000 | .000 |
| PB7 | .000 | .853 | .000 | .000 |
| PB6 | .000 | .886 | .000 | .000 |
| PB5 | .000 | .872 | .000 | .000 |
| PB20 | .000 | .000 | .000 | .627 |
| PB18 | .000 | .000 | .000 | .860 |
| PB16r | .000 | .000 | .719 | .000 |

Indirect Effects (Group number 1 - Default model)

| | Norms | Attitude | Control | Intention |
|---|---|---|---|---|
| Intention | .000 | .000 | .000 | .000 |
| PB17 | -.598 | .683 | .945 | .000 |
| PB19 | -.545 | .623 | .863 | .000 |
| PB12r | .000 | .000 | .000 | .000 |
| PB11 | .000 | .000 | .000 | .000 |
| PB10 | .000 | .000 | .000 | .000 |
| PB15r | .000 | .000 | .000 | .000 |
| PB14 | .000 | .000 | .000 | .000 |
| PB13 | .000 | .000 | .000 | .000 |
| PB8 | .000 | .000 | .000 | .000 |
| PB7 | .000 | .000 | .000 | .000 |
| PB6 | .000 | .000 | .000 | .000 |
| PB5 | .000 | .000 | .000 | .000 |
| PB20 | -.460 | .526 | .728 | .000 |
| PB18 | -.570 | .651 | .902 | .000 |
| PB16r | .000 | .000 | .000 | .000 |

Standardized Indirect Effects (Group number 1 - Default model)

| | Norms | Attitude | Control | Intention |
|---|---|---|---|---|
| Intention | .000 | .000 | .000 | .000 |
| PB17 | -.437 | .527 | .703 | .000 |
| PB19 | -.377 | .454 | .606 | .000 |
| PB12r | .000 | .000 | .000 | .000 |
| PB11 | .000 | .000 | .000 | .000 |
| PB10 | .000 | .000 | .000 | .000 |
| PB15r | .000 | .000 | .000 | .000 |
| PB14 | .000 | .000 | .000 | .000 |
| PB13 | .000 | .000 | .000 | .000 |
| PB8 | .000 | .000 | .000 | .000 |
| PB7 | .000 | .000 | .000 | .000 |
| PB6 | .000 | .000 | .000 | .000 |
| PB5 | .000 | .000 | .000 | .000 |
| PB20 | -.280 | .337 | .450 | .000 |
| PB18 | -.384 | .463 | .617 | .000 |
| PB16r | .000 | .000 | .000 | .000 |

Minimization History (Default model)

| Iteration | | Negative eigenvalues | Condition # | Smallest eigenvalue | Diameter | F | NTries | Ratio |
|---|---|---|---|---|---|---|---|---|
| 0 | e | 8 | | -.740 | 9999.000 | 493.608 | 0 | 9999.000 |
| 1 | e* | 9 | | -.294 | 4.087 | 274.424 | 20 | .273 |
| 2 | e* | 4 | | -.150 | .719 | 209.089 | 6 | .762 |
| 3 | e | 2 | | -.054 | .838 | 146.060 | 5 | .904 |
| 4 | e | 0 | 1574.255 | | .653 | 120.827 | 5 | .885 |
| 5 | e | 0 | 246.419 | | .913 | 115.380 | 2 | .000 |
| 6 | e | 0 | 333.936 | | .244 | 114.054 | 1 | 1.049 |
| 7 | e | 0 | 357.041 | | .040 | 114.017 | 1 | 1.031 |
| 8 | e | 0 | 358.725 | | .003 | 114.017 | 1 | 1.003 |
| 9 | e | 0 | 358.983 | | .000 | 114.017 | 1 | 1.000 |

**Model Fit Summary**

CMIN

| Model | NPAR | CMIN | DF | P | CMIN/DF |
|---|---|---|---|---|---|
| Default model | 51 | 114.017 | 84 | .016 | 1.357 |
| Saturated model | 135 | .000 | 0 | | |
| Independence model | 15 | 497.471 | 120 | .000 | 4.146 |

Baseline Comparisons

| Model | NFI Delta1 | RFI rho1 | IFI Delta2 | TLI rho2 | CFI |
|---|---|---|---|---|---|
| Default model | .771 | .673 | .927 | .886 | .920 |
| Saturated model | 1.000 | | 1.000 | | 1.000 |
| Independence model | .000 | .000 | .000 | .000 | .000 |

Parsimony-Adjusted Measures

| Model | PRATIO | PNFI | PCFI |
|---|---|---|---|
| Default model | .700 | .540 | .644 |
| Saturated model | .000 | .000 | .000 |
| Independence model | 1.000 | .000 | .000 |

NCP

| Model | NCP | LO 90 | HI 90 |
|---|---|---|---|
| Default model | 30.017 | 6.065 | 62.030 |
| Saturated model | .000 | .000 | .000 |
| Independence model | 377.471 | 312.400 | 450.096 |

FMIN

| Model | FMIN | F0 | LO 90 | HI 90 |
|---|---|---|---|---|
| Default model | 3.167 | .834 | .168 | 1.723 |
| Saturated model | .000 | .000 | .000 | .000 |
| Independence model | 13.819 | 10.485 | 8.678 | 12.503 |

RMSEA

| Model | RMSEA | LO 90 | HI 90 | PCLOSE |
|---|---|---|---|---|
| Default model | .100 | .045 | .143 | .063 |
| Independence model | .296 | .269 | .323 | .000 |

AIC

| Model | AIC | BCC | BIC | CAIC |
|---|---|---|---|---|
| Default model | 216.017 | 297.617 | | |
| Saturated model | 270.000 | 486.000 | | |
| Independence model | 527.471 | 551.471 | | |

ECVI

| Model | ECVI | LO 90 | HI 90 | MECVI |
|---|---|---|---|---|
| Default model | 6.000 | 5.335 | 6.890 | 8.267 |
| Saturated model | 7.500 | 7.500 | 7.500 | 13.500 |
| Independence model | 14.652 | 12.844 | 16.669 | 15.319 |

HOELTER

| Model | HOELTER .05 | HOELTER .01 |
|---|---|---|
| Default model | 34 | 37 |
| Independence model | 11 | 12 |

## Appendix H. Regression Statistics Output

### Regression Analysis Test – Test One

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .301[a] | .091 | .008 | 1.12152 |

a. Predictors: (Constant), Interaction, Idealism, Relativism

**ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 4.138 | 3 | 1.379 | 1.097 | .364[a] |
| | Residual | 41.507 | 33 | 1.258 | | |
| | Total | 45.645 | 36 | | | |

a. Predictors: (Constant), Interaction, Idealism, Relativism
b. Dependent Variable: ToPB – Attitude (2nd 4 Questions)

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 7.648 | 3.415 | | 2.240 | .032 |
| | Idealism | -.090 | .098 | -.556 | -.914 | .367 |
| | Relativism | -.143 | .105 | -.976 | -1.365 | .182 |
| | Interaction | .003 | .003 | .947 | 1.096 | .281 |

a. Dependent Variable: ToPB – Attitude (2nd 4 Questions)

### Regression Analysis – Preliminary Factors

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .599[a] | .358 | .318 | .58031 | .358 | 8.933 | 2 | 32 | .001 |

a. Predictors: (Constant), Relativism, Idealism

**ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 6.017 | 2 | 3.008 | 8.933 | .001[a] |
| | Residual | 10.776 | 32 | .337 | | |
| | Total | 16.793 | 34 | | | |

a. Predictors: (Constant), Relativism, Idealism
b. Dependent Variable: ToPB – Attitude (1st 4 Questions)

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 2.518 | .642 | | 3.923 | .000 |
| | Idealism | .058 | .014 | .572 | 4.009 | .000 |
| | Relativism | -.011 | .013 | -.116 | -.810 | .424 |

a. Dependent Variable: ToPB – Attitude (1st 4 Questions)

## Regression Analysis – Test Two

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .687[a] | .472 | .421 | .53477 |

a. Predictors: (Constant), Interaction, Idealism, Relativism

**ANOVA[b]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7.928 | 3 | 2.643 | 9.240 | .000[a] |
| | Residual | 8.865 | 31 | .286 | | |
| | Total | 16.793 | 34 | | | |

a. Predictors: (Constant), Interaction, Idealism, Relativism
b. Dependent Variable: ToPB – Attitude (1st 4 Questions)

**Coefficients**[a]

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. |
| 1 | (Constant) | 6.570 | 1.675 | | 3.921 | .000 |
| | Idealism | -.062 | .048 | -.614 | -1.286 | .208 |
| | Relativism | -.140 | .052 | -1.528 | -2.719 | .011 |
| | Interaction | .004 | .001 | 1.756 | 2.585 | .015 |

a. Dependent Variable: ToPB – Attitude (1st 4 Questions)

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## Vita

Captain SaraJo Paluch graduated from Bottineau High School in Bottineau, North Dakota in May 2006. She entered undergraduate studies at the University of North Dakota in Grand Forks, North Dakota where she graduated with a Bachelor of Science degree in Community Nutrition in August 2010. She was commissioned through Detachment 610, AFROTC, at the University of North Dakota.

Captain Paluch was first assigned as a student to the 333d Training Squadron, Keesler Air Force Base, Mississippi, completing Undergraduate Cyber Training in May 2011. In August she was assigned to the 461st Air Control Networks Squadron, Robins AFB, Georgia where she served as both Officer in Charge (OIC), Communications Security and Executive Officer. While stationed at Robins, she deployed overseas in May 2013 to Al Udeid Air Base, Qatar as the OIC, JSTARS Network Operations for the 7$^{th}$ Expeditionary Airborne Command and Control Squadron, 379$^{th}$ Air Expeditionary Wing. In August 2013, she entered the Graduate School of Engineering and Management, Air Force Institute of Technology. Upon graduation she will be assigned to Air Force Material Command A-8, Strategic Plans and Programs at Wright-Patterson AFB, Ohio.

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**14. ABSTRACT**

Currently, the requirement to obtain and maintain professional credentials within the engineering discipline varies among the five military departments within the U.S. Department of Defense (DoD). However, there may be an ethical requirement to do so. The purpose of this research was to investigate ethical theory and behavior theory, and their influence on the decision to obtain and maintain professional credentials. Individual Moral Philosophy (IMP) is one approach describing ethical thought. The Ethics Position Questionnaire (EPQ) measures the two dimensions of IMP: idealism and relativism. The Theory of Planned Behavior (ToPB) is used in research to predict behavior intentions and subsequently behavior from three factors: attitude toward a behavior, subjective norms, and perceived behavioral control.

A six-section survey (100 questions) was distributed to two separate groups of military engineers and thirty-seven responses were received. Confirmatory factor analysis, structural equation modeling, and multiple regression analysis were used to validate the ToPB and subsequently test the impact of the two dimensions of IMP from the EPQ on attitude. Results showed support for the predictive ability of attitude, norms, and control on intentions, and the addition of the two dimensions from the EPQ as predictors of attitude toward a behavior.

**15. SUBJECT TERMS**

Professional Credentials, Certification, Licensure, Ethics, Theory of Planned Behavior, Behavior, Attitude

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